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Art. I.—*On the Longevity of Seeds.*

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Probably few sections of human knowledge contain a larger percentage of contradictory, incorrect and misleading observations than prevail in the works dealing with this subject, and, although such fables as the supposed germination of mummy wheat have long since been exploded, equally erroneous records are still current in botanical physiology. In addition there are considerable differences of opinion as to the causes which determine the longevity of seeds in the soil or air. The works of de Candolle, Duvel and Becquerel are the most accurate and comprehensive dealing with the question, and in addition Vilmorin has published very useful data in regard to the seeds of culinary vegetables. The subject is still, however, in an incomplete and fragmentary condition.

Shortly after my arrival in Melbourne, in a locked cupboard received from the late Prof. McCoy's old Natural History department, two large packages of named seeds were found, including over 600 different sorts. The packets were all numbered and named, and accompanied by a list, dated 1850, and marked "Seeds of Kew." The paper, however, of the list and packets bore an 1856 watermark, and on reference to Kew, Dr. Prain considered the 1850 to be probably an error for 1856. On further investigation it was found that when the University of Melbourne was founded, Baron von Mueller sent these seeds to Prof. McCoy for the University garden, but as the garden was not ready the seeds were placed on one side and replaced later by fresh sendings. The original 1856 sets of seeds became subject to Prof. McCoy's remarkable powers of collecting and storing material, and remained unopened and untouched in a dry, airy, dark cupboard, shielded completely from vermin, until the University's 50-year Jubilee in 1906.

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[1] With the aid of a special grant from the Agricultural Department.

These seeds were tested at first in soil, but this was soon found to be unsatisfactory. Subsequently all were soaked in water after counting, hard seeds specially treated to make them swell, and then placed on filter paper in glass dishes kept in a germination chamber. The elaborate methods used by Becquerel are less satisfactory than a daily inspection of the material, and renewal of the filter paper or washing whenever necessary. All the seeds were, before being finally rejected as non-germinable, tested by crushing or hand-lens examination. Prior to this they were exposed to light and to a raised temperature of 30-40 deg. C. for some time, whereas during the early period of each test every batch of seed was approximately at a temperature of 25 deg. C., and in feeble light or darkness.

About 200 sets of 10-year-old seeds were obtained from Mr. Maiden, and Mr. Baker, of Sydney, and from Prof. Stirling, of Adelaide. The remainder came from the National Herbarium, either from dated specimens or from stored dated seed which had been used in the past for exchange purposes. A total of nearly 3000 tests were made, although many, being made in duplicate, appear once only in the alphabetical lists. With these are incorporated all the previous records I could find, so that these could be verified or corrected, as might be the case, and the list made as comprehensive as possible. In addition the list includes a number of observations by Darwin, Berkeley, Giglioli, Duvel and others on the resistance of seeds to sea-water, and to other injurious agencies or conditions, including burial in the soil since these are factors in longevity.

The first column gives the name of the seed, the second the age in years, the third the number of seeds tested[1], the fourth the percentage germinating (which in nearly all previous records is omitted!), and the fifth the author making the observation and any remarks as to treatment. If no author's name is given the observation is original. To save frequent footnotes, a reference list of the chief works consulted is appended beneath.

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[1] Where the number is marked with an asterisk (*), this is the original percentage germination of the fresh seed; but, if the percentage is 100, this means either that all the seeds originally were germinable, or that the number in the next column has been calculated on the basis of a 100 per cent. germination in the original seed, and gives the percentage of originally germinable seeds remaining germinable.

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	Years old.	No. of Seeds.	Per cent. Germ.	
Abrus, sp.	10	26	nil	Nobbe's, Samen Kunde.
Abutilon Avicennae, Gaertn.	12		15	
ditto	12		48	
var. Behriana, F. v. M.	20	150	8	
ditto	57	45	6	Sw. after ½ hr. in acid.[1]
ditto		150	2	Sw. in water.
Fraseri, Walp., var. diplotrichum, F. v. M.	47	15	nil	Sw. water.
indicum, Sweet	12		12	Nobbe's, Samen Kunde.
Mitchelli, Benth.	10	50	44	All sw. after 2½ hr. in acid.
mollissimum, Sweet	15	20	nil	A. de C.
oxycarpum, F. v. M.	14	100	12	Swelled in water.
		100	52	After 1¼ hr. in acid.
Acacia acinacea, Lindl., var. Latrobei.	51	28	3.6	After 6 months in soil.
alata, R. Br.	30	15	nil	Sw. water.
		8	12	Sw. after 1 hr. in acid.
aneura, F. v. M.	46	20	nil	All sw. water.
ditto	20	8	12.5	Sw. water.
		8	100	Sw. after 2 hr. in acid.
armata, R. Br.	51	45	11	5 m. soil, then in warm water 1 week.
aspera, Lindl.	54	30	nil	All sw. water.
bossiaeoides, A. Cunn.	57	25	nil	Sw. in water.
		18	5.5	In acid 2 hr.

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[1] The acid used was concentrated sulphuric (H_2SO_4).

D. = Darwin; A. de C. = A. de Candolle; sw. = swelled; hr. = hours; d. = days; m. = months; des. = desiccated; supp. = supposed.

Where two records follow one age, these are from the same batch of seed, of which some have swollen in water, others only after treatment with acid.

	Years old.	No. of Seeds.	Per cent. Germ.	
brachybotrya, Benth.	57	50	nil	Swelled water.
		14	21.4	In acid 2 hr.
calamifolia, Sweet.	18	5	80	2 hr. in acid.
calamifolia, Sweet., var. Wilhelmiana, F. v. M.	58	16	nil	All sw. in water.
cibaria, F. v. M.	47	19	nil	All sw. water. No signs of life.
cornigera, Willd.	36		some	Becquerel.
cultriformis, A. Cunn.	50	24	nil	
dealbata, Link.	15	2	nil	Sw. in water.
		28	67.8	In acid 2 hr.
decurrens, Willd.	17	60	63	Sw. only after 2 hr. in acid.
diffusa, Lindley.	29	2	nil	Sw. in water.
		13	15	Sw. after 2 hr in acid.
ditto	57	32	9	Sw. after 3 hr. in acid.
ditto	59	10	10	Sw. after 18 hr. in acid.
diffusa, Lindley, var. cuspidata, A. Cunn.	50	30	nil	
ditto	55	20	nil	In acid 2 hr.
doratoxylon, Cunn.	20	33	3	Sw. water.
		34	9	Sw. after 1½ hr. in acid.
elata, A. Cunn.	30	19	16	Sw. after 3 hr. in acid.
Farnesiana, Willd.	15	20	5 to 15	A. de C.
genistoides, A. Cunn.	30	10	nil	Sw. after 1 hr. in acid. Cotyledons of 1 living.
glaucescens, Willd.	16	10	40	2 hr. in acid.
ditto	16	1	nil	Sw. water.
		32	6	Sw. after 2 hr. in acid.

	Years old.	No. of Seeds.	Per cent. Germ.	
ditto	20	12	nil	Sw. water.
		14	93	Sw. only after 2 hr. in acid.
hakeoides, A. Cunn.	57	18	nil	All sw. water.
homalophylla, A. Cunn.	47	25	nil	All sw. water.
lanigera, A. Cunn.	20	2	nil	Sw. water.
		34	26	Sw. after 2 hr. in acid.
leiophylla, Benth.	30	52	nil	All sw. water.
Acacia, sp.	42	35	28.6	Det. as A. leprosa after germ.
leprosa, Sieber (A. reclinata).	47	7	28.6	After 2 hr. in acid.
leprosa, Sieber.	48	150	10.7	After 2 hr. in acid.
leprosa, Sieber.	51	19	21	7 remained in the soil 6 months unswollen. Of these 4 were germinable after 1 hr. in acid.
leprosa, var.	51	28	28	16 unswollen after 6 months in soil. Of these 8 proved germinable after 1 hr. in acid.
longifolia, Willd.	fresh	100	89	Des., 98 d. at 37 deg. C.
ditto	50	25	12	6 hard after 5 months in soil. Of these 3 germinated after 2 hr. in acid.
ditto	51	33	24.2	Most unswollen after soaking. These 2 hr. in acid.
longifolia, Willd. (A. sophora).	52	70	21.4	After 3½ hr. in acid.
ditto	50	14	nil	Sw. in water.
ditto	51	50	6	Sw. after 2 hr. in acid.

	Years old.	No. of Seeds.	Per cent. Germ.	
longifolia, Willd.	54	125	8	Filed to make seed swell.
ditto	54	100	4	5 min. 10 per cent. KHO, then warm water.
ditto	66	30	10	Sw. after 3 hr. in acid.
ditto	68	20	5	5 min. 10 per cent. KHO, then warm water.
lunata, Sieb.	48	8	nil	Sw. water
		25	12	Sw. after 2 hr. in acid.
ditto	50	33	nil	
melanoxylon, R. Br.	51	17	11.7	After 1 hr. in acid.
melanoxylon, R. Br., var. brevipes, A. Cunn.	55	21	nil	All sw. water.
Merralli, F. v. M.	10	50	6	Sw. after 1 hr. in acid.
Mitchelli, Benth.	57	30	nil	Imp. ripe. Sw. in water.
montana, Benth.	40	100	11	All sw. after $2\frac{1}{2}$ hr. in acid.
ditto	58	50	2	All sw. after 3 hr. in acid.
myrtifolia, Willd.	40	4	nil	All sw. water.
		35	3	Sw. after 2 hr. in acid.
ditto	51	50	20	Not all swollen until after 2 months in water at 20-25 deg. C.
ditto	54	50	12	8 hard after 5 months in soil. Of these 6 germinated after 1 hr. in acid.
ditto	55	80	5	Filed.
ditto	55	50	nil	5 min. 10 per cent. KHO, then warm water.
neriifolia, A. Cunn (var. iteaphylla).	17	100	4	Sw. after 1 hr. in acid.

	Years old.	No. of Seeds.	Per cent. Germ.	
nervosa, D. C.	30	50	4	Sw. only after 2 hr. in acid.
Oswaldi, F. v. M.	10	11	45	Sw. water.
		3	66	Sw. after 2 hr. in acid.
paucijuga, F. v. M.	57	18	nil	Swell in water.
penninervis, Sieb.	23	60	nil	All sw. water .
ditto	57	15	13.3	4 hr. in acid.
ditto	67	44	2.3	4 hr. in acid.
pentadenia, Lindl.	30	15	nil	Sw. water.
		13	15	Sw. after 1½ hr. in acid.
pycnantha, Benth.	35	100	nil	Sw. after 2 hr. in acid.
ditto	50	50	nil	
ditto	fresh	100	72	Des., 98 d. at 37 deg. C.
saligna, Wendl.	17	16	nil	In acid 1½ hr.
Senegal, Willd (var. rupestris).	51	38	5.2	2 remained hard in soil for 5 months. Of these one was germinable after 1 hr. in acid.
sentis, F. v. M.	57	10	nil	
Simsii, A. Cunn.	31	6	nil	Sw. water.
		13	23	Sw. after 2 hr. in acid.
suaveolens, Willd.	51	25	4	Sw. after 1 hr. in acid.
teretifolia, Benth.	30	7	nil	Sw. water.
		7	nil	Sw. after 1 hr. acid. Cot. of 2 living.
triptycha, F. v. M.	37	8	nil	Sw. water.
		33	nil	Sw. after 1 hr. in acid.
verniciflua, A. Cunn.	41	18	nil	18 swelled on soaking.
		82	5	2 hr. in acid.

	Years old.	No. of Seeds.	Per cent. Germ.	
vestita, Ker. Gawl.	50	14	nil	
vomeriformis, A. Cunn.	56	13	nil	All sw. water.
vypres (?) MS. of F. v. M.	55	60	3.3	1 hr. in acid. Seedlings died.
Aoaena montana, Hook.	57	30	nil	
ovina, A. Cunn.	57	100	nil	
sanguisorbae, Vahl.	54	50	nil	
Acer macrophyllum, Pursh.	14	56	nil	
ditto	15	71	nil	
ditto	24	71	nil	
saccharinum, Wangenh.	17	76	nil	
spicatum, Lam.	67	58	nil	
Achillea Millefolium, Linn.	8	100	nil	
ditto	10	150	nil	
ditto	18?		few	Peter. Supp. age in soil.
ditto	50	10	nil	
Achras australis, R. Br.	10	25	nil	
Achyranthes australis, R. Br., var. mollis	57	38	nil	
Acnida cannabina, L.	15	20	nil	A. de C.
Actaea spicata, Linn., var. rubra.	67	31	nil	
Actephila grandifolia, Baill.	16	9	nil	
Adansonia Gregorii, F. v. M.	12	28	3.6	Sw. after 6 hr. in acid.
Adenanthera pavonina, L.	8	27	15	Swelled after filing.
Adenophora communis, Fisch.	50	90	nil	
Adlumia cirrhosa, Rafin.	50	50	nil	
Adonis autumnalis, L.	50	14	nil	
Aethusa Cynapium, L.	10	130	nil	

	Years old.	No. of Seeds.	Per cent. Germ.		
ditto	20?		few	Peter.	Supp. time in soil.
Cynapium, L., var. agrestis.	9	88	nil		
ditto	20?		few	Peter.	Supp. age in soil.
Ageratum conyzoides, L., var. Mexicanum.	fresh		1	D. after 100 d. sea water.	
Ageratum conyzoides, L., var. Mexicanum.	50	150	nil		
Agropyron pectinatum, Beauv., var. alpina.	57	65	nil		
Agropyron repens, Beauv.	57	70	nil		
ditto	1	80*	84	Duvel.	Buried in soil 73 per cent.
repens, Beauv., var. brevisecta, F. v. M.	15	20	nil	A. de C.	
scabrum, Beauv.	54	68	nil		
ditto	55	59	nil		
ditto	55	100	nil		
Agrostis alba. L.	55	100	nil		
canina, L.	12	200	nil		
ditto	32?		many	Peter.	Supp. age in ground.
ditto	45	250	nil		
monandra, Hornem.	15	20	nil	A. de C.	
Muelleri, Benth.	57	200	nil		
scabra, Willd.	54	34	nil		
scabra, Willd., var. parviflora, R. Br.	54	150	nil		
stolonifera, L.	fresh		21	Nobbe.	
ditto	3		20	Nobbe.	
vulgaris, With.	14	200	nil		
ditto	32?		few	Peter.	Supp. age in ground.
ditto	40	150	nil		
ditto	100?		few	Peter.	Supp. age in ground.

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* Original percentage germination.

	Years old.	No. of Seeds.	Per cent. Germ.	
Aira caespitosa, L.	100?		few	Peter. Supp. age in ground.
caryophyllea, L.	59	35	nil	
praecox, L.	68	64	nil	
Ajuga australis, R. Br.	57	34	nil	
australis, R. Br., var. luxuriosa, F. v. M.	54	30	nil	
chamaepytis, Sch.	67	74	nil	
pyramidalis, L.	15	20	nil	A. de C.
Akania Hillii, Hook. f.	12	33	nil	
Albizzia Julibrissin, Durazz.	15	20	nil	A. de C.
Lebbek, Benth.	11	9	44.4	After scratching surface.
lophantha, Benth.	13	5	nil	Swelled in water.
		13	38.4	3 hr. in acid
ditto	17	10	nil	Swelled in water. Imp. ripe.
		43	79	In acid 4 hr.
lophantha, Benth.	50	15	33	4 hr. in acid.
saman, Benth.	13	9	nil	Sw. after filing.
arvensis, Scop.	59	61	nil	
Alchemilla alpina, L.	12	180	nil	
ditto	20?		few	Peter. Supp. time in soil.
ditto	25	160	nil	
ditto	36?		few	Peter. Supp. time in soil.
ditto	59	73	nil	
vulgaris, L.	57	100	nil	
Aleurites triloba, Forst. var. moluccana	79	54	74	Sw. in water.
		28	21	Sw. after $2\frac{1}{2}$ hr. in acid.
Alhagi camelorum, Fisch.			some	Chamisso. After 1 m. in sea water.

	Years old.	No. of Seeds.	Per cent. Germ.	
Alisma Plantago, L.	ripe		nil	Coats intact. Crocker.
ditto	ripe		98	Coats broken. Crocker.
ditto	54	200	nil	
Alkanna lutea, A. de C.	50	24	nil	
Allium angulosum, L.	25	250	nil	
ascalonicum, L.	fresh		95	Kinzel. 8 days' darkness at 20 deg. C.
ditto	fresh		7	Kinzel. 8 days' light at 20 deg. C.
Cepa, L. (Onion).	fresh	15	20	Berkeley. After 56 days, sea water.
ditto	fresh		many	D. After 82 days, cold sea water.
ditto	fresh	25	12	Berkeley. After 100 days, sea water.
ditto	fresh		75	Kinzel. 4 days' darkness at 20 deg. C.
ditto	fresh		70	Kinzel. 4 days' light at 20 deg. C.
ditto	2	100*	50	Vilmorin. Ext. limit, 7 yrs.
ditto	1	94*	88	Duvel.
ditto	1	94*	nil	Buried in soil.
Cepa, L., aegypticum	15	20	nil	A. de C.
fistulosum, L., var. (Welsh onion, white).	3	100*	50	Vilmorin. Ext. limit, 8 yrs.
fistulosum, L. (red Welsh onion).	2-3	100*	50	Vilmorin. Ext. limit, 7 yrs.
Porrum, L. (Leek).	2	100*	50	Vilmorin. Ext. limit, 6 yrs.
sphaerocephalum, L.	15	20	nil	A. de C.
Aloe saponaria, Haw.	50	54	nil	
Alopecurus geniculatus, L.	54	500	nil	
Alphitonia excelsa, Reissek.	12	50	74	Sw. water.
Alnus acuminata, H. B. and K.	50	49	nil	
cordifolia, Tenore.	18	150	nil	

	Years old.	No. of Seeds.	Per cent. Germ.	
glutinosa, Medic.	10	250	nil	
ditto	18	200	nil	
ditto	200?		some	Poisson. Supp. age in soil.
incana, Medic.	45	120	nil	
ditto	61	58	nil	
maritima, Nutt.	14	83	nil	
ditto	46	85	nil	
orientalis, Decne.	55	35	nil	
serrulata, Willd.	36	130	nil	
ditto	50	55	nil	
ditto	67	100	nil	
viridis, D. C.	43	53	nil	
ditto	44	110	nil	
ditto	48	57	nil	
Althaea hirsuta, L.	56	128	nil	All sw. water.
narbonnensis, Pourr.	15	20	nil	A. de C.
officinalis, Linn.	50	55	nil	
rosea, Cav. (Holly Hock)	9	100	33	Sw. rapidly after filing.
rosea, Chaters superb	10	250	nil	
Alyssum argenteum, Vilm.	50	42	nil	
linifolium, Steph.	51	150	nil	
micropetalum, Kit.	15	20	nil	A. de C.
rostratum, Stev.	15	20	nil	A. de C.
saxatile, L.	15	20	nil	A. de C.
Alyxia buxifolia, R. Br.	50	33	nil	
buxifolia, R. Br., var. capitellata	57	10	nil	

	Years old.	No. of Seeds.	Per cent. Germ.	
ruscifolia, R. Br.	10	25	12	
ditto	50	14	nil	
Amaranthus Blitum, L., var. prostratus	15	20	nil	A. de C.
caudatus, L.	15	20	nil	A. de C.
ditto	50	270	nil	
cernuus, Bess.	15	20	nil	A. de C.
hybridus, L.	67	108	nil	
paniculatus,, L.	15	20	nil	A. de C.
paniculatus, L., var. speciosus	15	20	nil	A. de C.
retroflexus, L.	1	95*	91	Duvel. Buried in soil 35 per cent.
retroflexus, L., var. curvifolius.	15	20	nil	A. de C.
Ambrosia artemisiaefolia, L.	1	58.5*	42.5	Duvel. Buried deeply, 41 per cent.
ditto	70	25	nil	
trifida, L.	1	29*	52	Duvel. Buried in soil, 6 per cent.
Ammania latifolia	15	20	nil	A. de C.
multiflora, Roxb., var. australasica.	57	1100	nil	
senegalensis, Lam., var. diffusa.	15	20	nil	A. de C.
Amorpha fruticosa, L.	15	20	nil	A. de C.
fruticosa, L., var. elatior.	50	15	nil	
fruticosa, L., var. glabra.	50	22	nil	
Amphibromus Neesii, Steud.	57	200	nil	
Anacardium occidentale, L.			some	Linnaeus. After a month in sea water.
Anagallis arvensis, L.	12	200	nil	
ditto	18?		few	Peter. Supp. age in soil.
ditto	18	150	nil	
ditto	20?		few	Peter. Supp. time in soil.

	Years old.	No. of Seeds.	Per cent. Germ.	
ditto	36?		few	Peter. Supp. time in soil.
ditto	40	128	nil	
ditto	45?		few	Peter. Supp. time in soil.
ditto	62	180	nil	
var. carnea.	15	20	nil	A. de C.
var. coerulea	50	580	nil	
var. latifolia.	15	20	nil	A. de C.
linifolia, L., var. grandiflora.	10	250	nil	
Anaphalis margaritacea, Bth. and Hook. f.	62	500	nil	
Anchusa capensis, Thunb.	50	45	nil	
Andromeda Polifolia, L.	58	53	nil	
Andropogon australis, Spr.	55	96	nil	
bombycinus, R. Br.	55	88	nil	
saccharoides, Sw., var. laguroides.	15	20	nil	A. de C.
sericeus, R. Br., var. chrysantheros.	57	50	nil	
Androsace maxima, L.	15	20	nil	A. de C.
Anemone nemorosa, L.	1	100	nil	Dried in des., 10-20 deg. C.
ditto	2	100	3	Air dried.
ditto	3	100	nil	Air dried.
virginiana, L.	67	42	nil	
Anguillaria dioica, R. Br.	40	83	nil	
Anigozanthos fuliginosa, Hook.	50	40	nil	
Manglesii, D. Don.	10	500	nil	
ditto	8	500	nil	
Anomatheca cruenta, Lindl.			some	Berkeley. After 1 month in sea water.

	Years old.	No. of Seeds.	Per cent. Germ.	
Anthistiria ciliata, L. f.	37	33	nil	
imberbis, Retz., var. australis.	55	56	nil	
Antholyza aethiopica, L.	50	16	nil	
aethiopica. L., var. flavescens	50	28	nil	
Anthoxanthum odoratum, L.	10	100	nil	
ditto	15	250	nil	
ditto	32?		few	Peter. Supp. age in soil.
Anthriscus Cerefolium, Hoffm. (Chervil).	2-3	100*	50	Vilmorin. Ext. limit, 6 yrs.
sylvestris, Hoffm.	55	60	nil	
vulgaris, Bernh.	15	20	nil	A. do C.
ditto	55	42	nil	
ditto	18	200	nil	
ditto	20?		few	Peter. Supp. time buried.
Anthyllis tetraphylla. L.	50	40	nil	
Vulneraria, L.	15	20	nil	A. do C.
Antigonon leptopus, Hook and Arn.	8	22	9	After prolonged soaking.
Antirrhinum calycinum, Russ.	50	150	nil	
glandulosum, Lindl.	10?		some	Meehan. Supp. ago in soil.
ditto	12	250	nil	
majus, L.	50	241	nil	
Apera Spica-Venti, Beauv.	60	1150	nil	
Apium graveolens, L. (Celery).			some	Thuret. After 13 mon. fl. on sea water.
ditto			many	D. After 85 days in sea water.
ditto			2	D. After 137 days in sea water.
ditto	fresh	100*	95	Kinzel. In light at 20 deg. C.
ditto	fresh	100*	nil	Kinzel. Darkness at 20 deg. C.

	Years old.	No. of Seeds.	Per cent. Germ.	
ditto	1	88*	83.5	Duvel. Buried deeply, 64 per cent.
ditto	8	100*	50	Vilmorin. Ext. limit, 10 yrs.
graveolens (Celery, red).	10	500	nil	
graveolens (Celery, white).	10	250	nil	
ditto	10	1000	nil	
ditto	fresh		some	D. 90 days in sea water.
inundatum, Reichb. f.	55	32	nil	
prostratum, Labill.	57	110	nil	
ditto	50	153	nil	
ditto	54	80	nil	
Aquilegia canadensis, L.	15	20	nil	A. de C.
vulgaris, L.	50	44	nil	
Arachis hypogaea, L. (Pea-nut).	1	100*	50	Vilmorin. Ext. limit, 1 year.
hypogaea, L.	1	9	89	
ditto	2	20	35	
ditto	8	45	nil	
ditto	50	14	nil	
Arabis auriculata, Lam.	15	20	nil	A. de C.
hirsuta, Scop.	59	100	nil	
hirsuta, Scop., var. sagittata.	15	20	nil	A. de C.
perfoliata, Lam.	55	2000	nil	
verna, R. Br.	50	480	nil	
Aralia racemosa, L.	67	28	nil	
Araliaceæ.	25		nil	Becquerel.
Araucaria Cunninghamii, Sweet.	14	30	nil	

	Years old.	No. of Seeds.	Per cent Germ.	
Archangelica officinalis, Hoffm.	1 to 2	100*	50	Vilmorin. Ext. limit, 3 yrs.
Archeria hirtella, Hook. f.	57	150	nil	
Arehontophoenix Alexandrae, W. and Dr.	8	16	nil	
Cunninghami, Wendl. and Drude	14	22	nil	
Arctium Lappa L.	1	100*	96	Duvel. Buried in soil 73 per cent.
majus, Bernh. (Giant Burdock)	5	100*	50	Vilmorin. Ext. limit, 6 yrs.
Arctotis acaulis L., var. grandiflora, Ait.	10	500	nil	
Arenaria peploides, L.	fresh		some	Guppy. After months on sea water.
serpyllifolia, L.	15	300	nil	
ditto	36?		few	Peter. Supp. time in soil.
ditto	45?		few	Peter. Supp. time buried.
ditto	59	80	nil	
ditto	67	36	nil	
stricta, Michx.	67	53	nil	
verna, L.	62	32	nil	
ditto	62	85	nil	
Argemone mexicana, L.			many	D. After 50 days in sea water.
ditto			few	D. After 70 days in sea water.
ditto	50	110	nil	
mexicana, L., var. alba.	15	20	nil	A. de C.
Argophyllum Nullumense, R. T. Baker	10	3000	nil	
Argyrolobium Linnaeanum, Walp.	50	100	nil	
Aristotelia racemosa, Hook. f.	57	100	nil	
Armeria elongata, Hoffm., var. vulgaris.	50	46	nil	
plantaginea, Willd.	50	42	nil	
Artanema fimbriatum, D. Don.	50	44	nil	

	Years old.	No. of Seeds.	Per cent. Germ.	
Artemisia Abrotanum, L.	15	20	nil	A. de C.
Absinthium, L. (Worm-wood).	4	100*	50	Vilmorin. Ext. limit, 6 yrs.
annua, L.	15	20	nil	A. de C.
biennis, Willd.	67	2000	nil	
camphorata, Vill.	15	20	nil	A. de C.
maritima, L.	56	500	nil	
vallesiana, Lam.	15	20	nil	A. de C.
vulgaris, L. (Mugwort, Mother-wort).	3	100*	50	Vilmorin. Ext. limit, 5 yrs.
Arthropodium laxum, Sieb.	47	25	nil	
Arum maculatum, L.			some	Berkeley. After 1 month in sea water.
Asclepias purpurascens, L., var. amoena.	15	20	nil	A. de C.
syriaca, L., var. Cornuti, Decne.			some	Martius. After 45 days floating on sea water.
Ascyrum Hypericoides, L.	1	1.5*	nil	Duvel. Buried in soil 1 per cent.
Aspalathus astroites, L.	50	6	nil	
sericea, L.	50	17	nil	
Asparagus, sp.			some	D. After 85 days in sea water.
officinalis, L. (Asparagus).	1	80*	69	Duvel. Buried in soil ; all died.
officinalis, L.	5	100*	50	Vilmorin. Ext. limit, 8 yrs.
Asperugo procumbens, L.	15	20	nil	A. de C.
ditto	50	42	nil	
Asperula arvensis, L.	15	20	nil	A. de C.
cynanchica, L.	15	20	nil	A. de C.
Gunnii, J. Hook.	54	16	nil	
orientalis, Boiss., var. azurea.	13	40	nil	

	Years old.	No. of Seeds.	Per cent. Germ.	
scoparia, J. Hook.	54	15	nil	
Asphodeline liburnica, Reichb.	50	12	nil	
lutea, Reichb.			some	Berkeley. After 30 days in sea water.
Asphodelus cerasiferus, J. Gay.			some	Martins. After 45 days in sea water.
fistulosus, L.	50	48	nil	
ramosus, L.	1 to 3 m'ths		90	Kinzel. 14 days' darkness at 20 deg. C.
ditto			42	Kinzel. 14 days' light at 20 deg. C.
ditto			90	Kinzel. 14 days' light at 14 deg. C.
Aster alpicola, F. v. M.	57	250	nil	
(Eurybia) asterotricha, F. v. M.	57	250	nil	
corymbosus, Ait.	67	250	nil	
patens, Ait.	67	150	nil	
tenuifolius, L.	67	250	nil	
Asterolasia pleurandroides, F. v. M.	57	28	nil	
Astragalus alpinus, L.	15	20	nil	A. de C.
Antiselli, A. Gray.	18	64	3.3	All sw. readily.
boeticus, L.	50	16	nil	
brachyceras, Ledeb.	37		some	Becquerel.
Cicer, L.	50	20	nil	
edulis, Dur.	22	18	nil	
falcatus, Lam.	50	11	nil	
galegiformis, L.	50	18	nil	
glycyphylloides, D. C.	50	26	nil	
ditto	51	26	7.7	After long soaking.
hamosus, L. (Worms).	3	100*	50	Vilmorin. Ext. limit, 8 yrs.
ditto	50	44	nil	

	Years old.	No. of Seeds.	Per cent. Germ.	
ditto	83	350	nil	
Tragacantha, L.	50	56	nil	
Astroloma humifusum, R. Br.	54	20	nil	
Astrotricha latifolia, Benth.	57	100	nil	
lodifolia, D. C., var. asperifolia.	54	125	nil	
Atriplex cinerea, Poir.	55	250	nil	
hastata, L., var. deltoidea, Bab.	59	200	nil	
hortensis, L. garden orache)			many	D. After 100 days in sea water.
ditto	6	100*	50	Vilmorin. Ext. limit, 7 yrs.
ditto	15	20	nil	A. de C.
ditto	50	22	nil	
ditto	300		nil	Nobbe. Old Herb.
nummularia, Lindl.	50	26	nil	
patula, L.	18	1000	nil	
ditto	22?		few	Peter. Supp. age in soil.
ditto	59	250	nil	
rhagodioides, F. v. M.	55	100	nil	
rosea, L.	15	20	nil	A. de C.
spongiosa, F. v. M.	57	28	nil	
tatarica, L.	15	20	nil	A. de C.
Atropa Belladonna, L.	14	200	nil	
ditto	20?		few	Peter. Supp. time in soil.
ditto	50	100	nil	
ditto	55	200	nil	
ditto	100?		few	Peter. Supp. age in ground.
Avena fatua, L.	1	70.5	91.5	Duvel. Buried in soil, 18 per cent.

	Years old.	No. of Seeds.	Per cent. Germ.	
ditto	59	43	nil	
sativa, L. (Oats)	fresh		many	D.C. Cooled 100 t. to about 50 deg. C.
ditto			many	D. After 85 days in sea water.
ditto			few	D. After 100 days in sea water.
ditto			partial	D. After 120 days in sea water.
ditto	many		many	Salter. In mud, under sea water.
ditto	1	70*	91.5	Duvel. Buried in soil; all died.
ditto	2		most	Rohde.
ditto	6	100	46	Dried at 12-15 deg. C. } Seeds from same sample.
ditto	6	100	93	Dried at 15-19 deg. C.
ditto	6	100	97	Dried at 28 deg. C.
ditto	10	100	84	Haberlandt.
ditto	1	100*	98	Burgerstein. Dry in air.
ditto	4	100*	95	” ”
ditto	7	100*	94	” ”
ditto	10	100*	93	” ”
Avicennia, sp.	1	100	nil	Dried in air.
Axyris amaranthoides, L.	1		nil	Duvel. If buried, also died.
Azorella cuneifolia, F. v. M.	57	35	nil	
Babiana plicata, Ker. Gawl.			some	Berkeley. After 1 month in sea water.
Baeckea densifolia, Sm.	57	30	nil	
diffusa, Sieber.	57	350	nil	
Gunniana, Sieber.	57	250	nil	
virgata, Andr.	57	80	nil	
ditto	57	150	nil	
Bambusa oliveriana, Gamble.	13	46	nil	

	Years old.	No. of Seeds.	Per cent. Germ.	
regia, Thoms.	14	12	nil	
Banksia collina, R. Br., var. prionophylla, F. v. M.	50	27	nil	
collina, R. Br., var. Cunninghamii, Sieber.	50	22	nil	
integrifolia, Linn. f.	50	14	nil	
verticillata, R. Br.	57	20	nil	
Baptisia australis, R. Br.	15	20	nil	A. de C.
tinctoria, R. Br.	67	55	nil	All sw. in water.
Barbarea praecox, R. Br.	3	100*	50	Vilmorin. Ext. limit, 5 yrs.
vulgaris, R. Br.	15	20	nil	A. de C.
ditto	55	100	nil	
ditto	57	136	nil	
Barklya syringifolia, F. v. M.	12	50	nil	2 hr. in acid produced rapid swelling.
ditto	8	20	40	ditto
Barringtonia Butonica, Forst., var. speciosa, L.			some	Moseley. Many months floating on sea water.
Bartsia Odontites, Huds.	15	20	nil	A. de C.
viscosa, L.	55	2000	nil	
ditto	60	250	nil	
Basella rubra, L., var. alba, L. (Common white Basella).	5	100*	50	Vilmorin. Ext. limit, 6 yrs.
ditto	10	40	10	
ditto	15	20	nil	A. de C.
Bauhinia, sp.	10	8	100	
purpurea, L.	8	16	nil	

	Years old.	No. of Seeds.	Per cent. Germ.	
variegata, L., var. alba, Buch. Ham.	8	30	nil	
Bedfordia salicina, D. C.	50	240	nil	
Benincasa cerifera, Savi. (Wax-Gourd).	10	100*	50	Vilmorin.
cerifera, Savi.	12	100	nil	
Berberis vulgaris, L., var. crataegina.	50	20	nil	
vulgaris, L., var. Iberica, Sweet.	50	16	nil	
vulgaris, L. dulcis.	50	12	nil	
ditto	50	16	nil	
Beta vulgaris, L., var. maritima, L.	15	20	nil	A. de C.
vulgaris, L. (Beet)			some	Martius. After 93 days floating on sea water.
ditto			some	Thuret. After 13 months floating on sea water.
ditto			many	Berkeley. After 100 days in sea water.
ditto	1	153*	90.5	Duvel. Buried in soil, 20 per cent.
ditto	6	100*	50	Vilmorin. Ext. limit, 10 years
ditto	2	10 x 2	70	Rom. Dried in air.
ditto	2	10 x 2	5	Rom. 1 yr. in vacuo.
ditto	2	10 x 2	16-17	Rom. 1 yr. in NH_3 or ether vapour.
ditto	2	10 x 2	12-14	Rom. 1 yr. in O, CO or chloroform.
ditto	2	10 x 2	50	Rom. 1 yr. in aqueous vapour.
ditto	2	10 x 2	95	Rom. 1 yr. in sulph. hydrogen.
ditto	12	102	3	After 6 weeks, moist and warm.
			1	After remainder ½ hr. in acid.

	Years old.	No. of Seeds.	Per cent. Germ.	
ditto	14	100	2	½ hr. in acid.
ditto	14	120	nil	After 10 weeks, moist and warm.
ditto	14	110	nil	½ hr. in acid.
ditto	14	108	nil	After 10 weeks, moist and warm.
Betula alba, L., var. glauca, Wender.	45	120	nil	
alba, L., var. japonica, Siebold.	46	85	nil	
alba, L., var. pubescens, Ehrh.	10	140	nil	
ditto	18?		few	Peter. Supp. age in soil.
ditto	20		some	Peter. Supp. time buried.
ditto	32?		few	Peter. Supp. age in ground.
ditto	35	150	nil	
ditto	45?		few	Peter. Supp. time buried.
ditto	50	120	nil	
ditto	100?		few	Peter. Supp. age in soil.
alba, L., var. verrucosa, Ehrh.	10	125	nil	
ditto	32?		few	Peter. Supp. age in ground.
ditto	50	150	nil	
ditto	100?		few	Peter. Supp. age in ground.
Beyera viscosa, Miq., var. oblongifolia	57	20	nil	
Bidens cernua, L.	15	20	nil	A. de C.
frondosa, L.	1	75*	52	Duvel. Buried in soil, 36 per cent.
pilosa, L.	50	215	nil	
ditto	50	26	nil	
tripartita, L.	57	100	nil	
Bifora dicocca, Hoffm.	15	20	nil	

	Years old.	No. of Seeds.	Per cent. Germ.	
Billardiera cymosa, F. v. M.	50	55	nil	
longiflora, Labill.	50	42	nil	
ditto	54	100	nil	
ditto	57	40	nil	
scandens, Sm.	50	42	nil	
Biscutella auriculata, L., var. erigerifolia	50	16	nil	
ditto	50	46	nil	
didyma, L., var. apula, L.	15	20	nil	A. de C.
Biserrula Pelecinus, L.	12	80	nil	
Blennodia lasiocarpa, F. v. M.	57	60	nil	
nasturtioides, Benth.	22	120	nil	
ditto	57	200	nil	
ditto	12	120	nil	
ditto	57	60	nil	
ditto	57	32	nil	
trisecta, Benth.	57	230	nil	
Boehmeria nivea, Gaud.	1		nil	Duvel. If buried, also died.
Boraginaceae	25		nil	Becquerel.
Borago officinalis, L. (Borage).			few	D. After 24 days in sea water.
ditto			nil	D. After 42 days in sea water.
ditto	8	100*	50	Vilmorin. Ext. limit, 10 years.
Boronia dentigera, F. v. M.	54	61	nil	
coerulescens, F. v. M.	57	27	nil	
parviflora, Sm., var. pilonema, Lab.	54	35	nil	

	Years old.	No. of Seeds.	Per cent. Germ.	
Bossiaea cinerea, R. Br.	55	35	nil	
foliosa, A. Cunn., var. distichoclada, F. v. M.	57	50	nil	
ensata, Sieb.	10	30	23.3	1 hr. in acid.
ditto	57	16	nil	
heterophylla, Vent.	15	20	50	Sw. in water.
		30	80	After 2 hr. in acid.
Stephensoni, F. v. M.	12	50	44	5 sw. in water, rest after ½ hr. in acid.
sulcata, Meissn.	57	16	nil	
Brachychiton populneum, R. Br.	57	6	nil	
Brassica alba, Boiss.	fresh		86	Nobbe.
ditto	2		76	Nobbe.
ditto	47	250	nil	
ditto	40	1000	nil	
ditto	44	150	nil	
ditto	77	115	nil	
alba, Boiss., var. flexuosa.	15	20	nil	A. de C.
alba, Boiss (White Mustard).	4	100*	50	Vilmorin. Ext. limit, 10 years.
ditto	10	200	nil	
campestris, L. (Swede).	5	100*	50	Vilmorin. Ext. limit, 10 yrs.
campestris, L.	12		5	Nobbe.
ditto	1	96*	80	Duvel. Buried deeply, 0.5 per cent.
campestris, L. (Rape).	10	250	nil	
campestris, L., var. chinensis, L.	5	100*	50	Vilmorin. Ext. limit, 9 yrs.

	Years old.	No. of Seeds.	Per cent. Germ.	
campestris, L., var. Rapa, L.	fresh		77	Nobbe.
campestris, L.	2		59	Nobbe.
campestris, L., var. Napus, L. (Rutabaga).	12		27	Nobbe.
ditto	fresh	100	43	Des. 42 days at 37 deg. C.
campestris, L., var. Rapa, L. (Yellow Turnip).			some	Berkeley. After 30 days in sea water.
campestris, L., Wild var.			1	D. After 133 days in sea water.
ditto			many	D. After 150 days in sea water .
ditto	5	100*	50	Vilmorin. Ext. limit, 10 years.
ditto	15	20	nil	A. de C.
ditto	12		nil	Nobbe.
dissecta, Boiss.	15	20	nil	A. de C.
fruticulosa, Cyril.	56	150	nil	
incana, Tenore.	15	20	nil	A. de C.
juncea, Cass. (Chinese large-leaved mustard)	4	100*	50	Vilmorin. Ext. limit, 8 yrs.
nigra, Koch. (Mustard).	1	15*	13	Duvel. Buried deeply, 14 per cent.
ditto	2	10	60	Rom. Dried in air.
ditto	2	10	60	Rom. 1 yr. in acid.
ditto	2	10	10	Rom. 1 yr. in N, CO, or in vacuo.
ditto	2	10	10	Rom. 1 yr. in aqueous vapour.
ditto	2	10	80	Rom. 1 yr. in ether or chloroform.
ditto	2	10	60	Rom. 1 yr. in hydrogen.
nigra, Koch (Black Mustard)	4	100*	50	Vilmorin. Ext. limit, 10 years.

	Years old.	No. of Seeds.	Per cent. Germ.	
oleracea, L.	1	85.5*	82	Duvel. Buried in soil; all died.
oleracea, L. (Cabbage).	5	100*	50	Vilmorin. Ext. limit, 10 yrs.
oleracea, L., acephala, D. C. (Borecole).	5	100*	50	Vilmorin. Ext. limit, 10 yrs.
oleracea, L., var. bullatagemmifera (Brussels Sprouts)	10	250	nil	
oleracea, L. (Colza).	12		30	Nobbe.
oleracea, L., botrytis, D. C. (Cauliflower)	5	100*	50	Vilmorin. Ext. limit, 10 yrs.
oleracea (Kohlrabi).	5	100*	50	Vilmorin. Ext. limit, 10 yrs.
oleracea, L. (Broccoli).			some	D. After 11 days in sea water.
ditto			nil	D. After 22 days in sea water.
oleracea, L. (Early Cauliflower).		100	5	D. After 22 days in sea water.
ditto			many	D. After 36 days in sea water.
oleracea, L. (Cattels Cabbage).			nil	D. After 50 days in sea water.
oleracea, L., Wild, var.			many	D. After 150 days in sea water.
ditto			1	D. After 133 days in sea water.
Sinapistrum, Boiss.	42	120	nil	
ditto	8		some	Poisson.
ditto	18	220	nil	
ditto	20?		some	Peter. Supp. time buried.
ditto	25	100	nil	
ditto	55	93	nil	
Sinapoides, Roth.	57	120	nil	
ditto	15	20	nil	

	Years old.	No. of Seeds.	Per cent. Germ.	
Bridelia exaltata, F. v. M.	12	30	nil	
Briza maxima, L.	50	410	nil	
ditto	55	100	nil	
minor, L.	55	100	nil	
Brodiaea congesta, Sm.	50	22	nil	
Bromus arenarius, Lab.	57	100	nil	
erectus, Huds., var. stenophyllus, Link.	15	20	nil	A. de C.
mollis, L.	10	250	nil	
ditto	18?		some	Peter. Supp. age in soil.
racemosus, L.	1	100*	98	Duvel. Buried in soil; all died.
ditto	15	20	nil	A. de C.
secalinus, L.	1	88*	77	Duvel. Buried in soil; all died.
ditto	5		nil	Dr. Beal. Buried in soil.
sterilis, L.	57	100	nil	
unioloides, H. B. and K.	12		nil	Nobbe.
Bruguiera Rheedii, Blume.			some	Hemsley. Many m. floating on sea water.
Bulbine annua, Willd.			some	Berkeley. After 30 days in sea water.
ditto	50	74	nil	
asphodeloides, Spreng.	50	84	nil	
bulbosa, Haw.	57	20	nil	
semibarbata, Haw.	50	42	nil	
Bunias orientalis, L. (Hill Mustard).	3	100*	50	Vilmorin. Ext. limit, 6 yrs.
ditto	15	20	nil	A. de C.
Bupleurum baldense, Host., var. tenuifolium, Pourr.	28	150	nil	

	Years old.	No. of Seeds.	Per cent. Germ.	
junceum, L.	15	20	nil	A. de C.
Odontites, L.	50	35	nil	
semicompositum, L.	15	20	nil	A. de C.
Buxus sempervirens, L.	55	35	nil	
Cadellia monostylis, Benth.	15	45	nil	
Caesalpinia Bonduc, Roxb.	fresh		some	Guppy. Filed after 1 yr. on sea water.
Bonducella, Fleming	fresh		some	Guppy. Filed after 1 yr. on sea water.
ditto	9	3	nil	Embryo loose in shell; outer grey layer impermeable; inner, brown and permeable.
ditto	15	24	20.1	Sw. after 24 hr. in acid. Cotyledon of another partly living.
Minax, Hance., var. burmannica	10	21	nil	
sp. (Guilandina).			some	D. After months in sea water.
Cakile maritima, Scop., var. americana, Nutt.	67	82	nil	
maritima, Scop.			some	Mart. After 45 days floating on sea water.
ditto	56	150	nil	
Calamintha Acinos, Man.	25	300	nil	
ditto	36		few	Peter. Supp. time in soil.
ditto	45?		few	Peter. Supp. time buried.
ditto	57	140	nil	
ditto	300		nil	Nobbe. Old Herb.
Clinopodium, Benth.	1	100	82	
ditto	2	100	68	

	Years old.	No. of Seeds.	Per cent. Germ.	
officinalis, Moench.	60	60	nil	
Calandrinia calyptrata, J. Hook.	57	300	nil	
discolor, Schrad., var, speciosa, Lehm.	57	600	nil	
pygmaea, F. v. M.	50	130	nil	
Calendula officinalis, L.	15	20	nil	A. de C.
ditto	50	81	nil	
suffruticosa, Vahl.	15	20	nil	A. de C.
Callistemon coccineus, F. v. M., var. rugulosus, Miq.	50	250	nil	
lanceolatus, Sweet.	16	2000	75	
rigidus, R. Br.	22	1000	2.8	
ditto	5	2000	18.6	
ditto	50	3800	nil	
salignus, D. C.	37	250	nil	
Callistephus hortensis, Cass.			some	D. After 28 days in sea water.
ditto			nil	D. After 54 days in sea water.
Callitriche autumnalis, L.	60	50	nil	
hamulata, Kuetz., var. pedunculata, D. C.	55	51	nil	
Callitris calcarata, R. Br., var. pyramidalis, Sw.	54	25	nil	
Muelleri, Benth.	15	75	nil	
rhomboidea, Mirb.	50	31	nil	

	Years old.	No. of Seeds.	Per cent. Germ.		
robusta, R. Br.	50	22	nil		
robusta, R. Br., var. Preissi, Miq.	57	30	nil		
robusta, R. Br , var. verrucosa.	47	30	nil		
Calocephalus Brownii, Cass.	50	140	nil		
Calochilus campestris, R. Br.	57	5000	nil		
Calophaca wolgarica, Fisch.	50	11	nil		
Calophyllum Inophyllum, L.			some	Hemsley.	Many months floating on sea water.
Calostrophus elongatus, F. v. M.	37	20	nil	Filed.	
Calothamnus quadrifidus, Ait.	50	249	nil		
Calotis anthemoides. F. v. M.	50	450	nil		
Calystegia marginata, R. Br.	57	60	nil		
Calythrix tetragona, Labill.	57	120	nil		
tetragona, Labill., var. scabra, D.C.	50	42	nil		
Camelina sativa, Crantz.	15	20	nil	A. de C.	
sativa, Crantz, var. dentata.	57	120	nil		
Campanula laciniata, L.			some	Thuret.	After 13 months floating on sea water.
latifolia, L.	55	1000	nil		
medium, L.	15	20	nil	A. de C.	
ditto	50	370	nil		
patula, L.	55	5000	nil		
pyramidalis, L.	15	20	nil	A. de C.	
Rapunculus, L. (Rampion).	4	100*	50	Vilmorin	Ext. limit, 8 yrs.
rapunculoides, L.	50	180	nil		

	Years old.	No. of Seeds.	Per cent. Germ.	
rotundifolia, L.	15	160	nil	
ditto	20?		few	Peter. Supp. time in soil.
sibirica, L.	15	20	nil	A. de C.
Trachelium, L.	100?		few	Peter. Supp. time in soil.
Canavalia ensiformis, D. C.	10	30	nil	
ensiformis, D. C., var. gladiata, D. C.	10	6	100	One required filing, rest sw. without.
ensiformis, D. C., var. brasiliensis.	15	20	5 to 15	A. de C.
obtusifolia, D. C.	16	12	50	After 2 hr. in acid.
ditto	60	13	30.7	All sw. without filing.
Canna gigantea, Desf.			some	Mart. After 93 days.
indica, L.			few	D. After 50 days in sea water.
ditto	50	16	nil	
Cannabis sativa, L. (Hemp).	fresh	100	52	Des. 7 days at 37 deg. C.
ditto		100	35	Des. 10 days at 37 deg. C.
ditto		100	7	Des. 14 days at 37 deg. C.
ditto	1		nil	Duvel. If buried, died.
ditto	fresh	100	87	Air dried to 9 per cent. water.
ditto	fresh	100	47	7 days des. at 37 deg. C., to 1.43 per cent. water.
ditto	fresh		nil	45 days des. at 37 deg. C., to 0.64 per cent. water.
ditto	fresh	100	94	35 days in dry H and N.
ditto	fresh	100*	93	After 14 days ster. oxygenless water.
ditto	fresh	100*	11	70 days ster. oxygenless water.
ditto	fresh	100*	9	98 days ster. oxygenless water
ditto	fresh	100*	nil	Des. 15 days at 37 deg. C.

	Years old.	No. of Seeds.	Per cent. Germ.	
ditto	fresh	100*	nil	Des. 1 day at 37 deg. C.
ditto	fresh	100*	nil	Des. 1 day at 50 deg. C.
ditto	fresh	100*	60	10 days in oxygenless water.
ditto	fresh	100*	17	28 days in oxygenless water.
ditto	fresh	100*	nil	56 days in oxygen.
ditto	fresh	100*	nil	1 day in aqueous Hg Cl_2
ditto	12		nil	Nobbe.
Capparis Mitchellii, Lindl.	57	25	nil	
nobilis, F. v. M.	10	45	7	6 weeks after filing.
spinosa, L., var. aculeata, Steud.	50	350	nil	
Caprifoliaceae.	25		nil	Becquerel.
Capsella antipoda, F. v. M.	47	130	nil	
Bursa-pastoris, Medic. Pfl.	1		nil	Duvel. If buried, all died.
ditto	3	80	nil	
ditto	5	120	nil	
ditto	20?		few	Peter. Supp. time in soil.
ditto	51	1000	nil	
ditto	59	76	nil	
procumbens, Fries., var. elliptica.	57	80	nil	
Capsicum annuum, L. (Capsicum).	1	96*	80	Duvel. Buried deeply, 0.5 per cent.
ditto		56	53	Berkeley. After 137 days in sea water.
ditto	4	100*	50	Vilmorin. Ext. limit, 7 yrs.
frutescens, L.	10	80	nil	
Caragana microphylla, Lam., var. altagana, Poir.	50	16	nil	
pygmaea, D. C,	50	11	nil	

	Years old.	No. of Seeds.	Per cent. Germ.	
ditto	50	15	nil	
Carbenia benedicta, Adans.	50	8	nil	
Cardamine dictyosperma, Hook .	54	120	nil	
hirsuta, L.	59	95	nil	
hirsuta, L., var. debilis, Banks and	54	58	nil	
Sol.	59	43	nil	
impatiens, L.				
laciniata, F. v. M.	57	50	nil	
pratensis, L. (Cuckoo-flower).	4	100*	50	Vilmorin.
stylosa, D. C.	54	113	nil	
tenuifolia, Hook.	54	87	nil	
Cardiospermum Halicacabum, L., var. Corindum, L.	15	20	nil	A. de C.
Carduus seminudus, Bieb.	50	38	nil	
pycnocephalus, L., var. tenuiflorus, Curt.	55	120	nil	
Carex binervis, Sm.	57	43	nil	
ditto	50	41	nil	
canescens, L.	58	41	nil	
canescens, L., var. curta, Good.	68	320	nil	
capillaris, L.	61	80	nil	
cephalotes, F. v. M.	50	100	nil	
cyperoides, Murr.	30		some	Poisson. In water.
ditto	72	400	nil	
ditto	70	250	nil	
ditto	65	1200	nil	

	Years old.	No. of Seeds.	Per cent. Germ.		
depauperata, Good.	58	50	nil		
distans, L.	58	15	nil		
divisa, Huds.	55	48	nil		
echinata, Murr., var. stellulata, Good.	67	55	nil		
extensa, L.	57	110	nil		
ditto	61	59	nil		
flava, L.	55	80	nil		
fulva, Good.	57	62	nil		
glauca, Scop.	15	300	nil		
ditto	32?		few	Peter.	Supp. age in ground.
ditto	45?		many	Peter.	Supp. time buried.
ditto	50	450	nil		
granularis, Muhl.	67	100	nil		
grisea, Viv., var. anceps, Willd.	67	120	nil		
Gunniana, Boott.	57	100	nil		
hirta, L.	59	73	nil		
muricata, L.	12	280	nil		
ditto	22	340	nil		
ditto	32?		few	Peter.	Supp. age in soil.
ditto	35?		few	Peter.	Supp. age in soil.
ditto	50	120	nil		
ditto	100?		some	Peter.	Supp. age in soil.
ditto	100?		few	Peter.	Supp. age in soil.
pallescens, L.	15	88	nil		
ditto	57	54	nil		

	Years old.	No. of Seeds.	Per cent. Germ.		
ditto	100?		few	Peter.	Supp. age in soil.
panicea, L.	46	185	nil		
ditto	65	54	nil		
ditto	67	48	nil		
ditto	69	62	nil		
ditto	72	59	nil		
paniculata, L.	50	150	nil		
ditto	80	1500	nil		
paradoxa, Willd.	34	68	nil		
ditto	57	80	nil		
remota, L.	18	240	nil		
ditto	25	130	nil		
ditto	100?		some	Peter.	Supp. age in ground.
sphaerostachya, Dewey.	60	100	nil		
ditto	55	43	nil		
sylvatica, Huds.	15	320	nil		
ditto	32?		few	Peter.	Supp. age in ground.
ditto	45?		few	Peter.	Supp. time buried.
ditto	55	53	nil		
ditto	100?		few	Peter.	Supp. age in soil.
pilulifera, L.	55	127	nil		
ditto	58	41	nil		
polyantha, Franch and Savi.	50	150	nil		
Pseudo-cyperus, L.	50	160	nil		
ditto	57	200	nil		
tomentosa, L.	60	52	nil		

	Years old.	No. of Seeds.	Per cent. Germ.	
vulpina, L.	55	100	nil	
Carpinus americana, Michx.	67	23	nil	
Betulus, L.	50	16	nil	
Carthamus tinctorius, L.	12		nil	Nobbe.
ditto	50	56	nil	
Carum Carvi, L. (Common Caraway)	3	100*	50	Vilmorin. Ext. limit, 4 yrs.
Petroselinum, Benth. and Hook. (Parsley).	fresh	100	42	1 h. at 100 deg. C., dry.
ditto	3	100*	50	Vilmorin. Ext. limit, 9 yrs.
ditto	55	61	nil	
segetum, Benth. and Hook. f.	55	100	nil	
Caryophyllaceae.	25		nil	Becquerel.
Cassia artemisioides, Gaud.	47	30	nil	All sw. water.
australis, Sims.	10	80	45	8 sw. on soaking, 1 germ. After 4 hr. in acid, rest sw., and 35 germ.
bicapsularis, L.	15	60	3.3	Sw. in water.
		14	14.3	Rest after 2 hr. in acid.
ditto	86		some	Becquerel.
Brewsterii, F. v. M.	19	20	90	Sw. only after 2 hr. in acid.
eremophila, A. Cunn.	10	26	nil	Sw. in water.
ditto	10	4	25	After 1½ hr. in acid.
ditto	50	24	nil	
var. platypoda, R. Br.	57	17	nil	Sw. in water.
Fistula, L.			some	Linnaeus. 1 yr. floating on sea water.
laevigata, Willd.	16	100	26	In acid 3 hr.
ditto	23	2	nil	Sw. water.
		150	nil	Sw. after ¾ hr. in acid.

	Years old.	No. of Seeds.	Per cent. Germ.	
marylandica, L.	1	14.5*	98	Duvel. Buried in soil, 5 per cent.
occidentalis, L.	50	35	nil	
pistaciaefolia, H. B. and K.	8	15	33	5 out of the 8 unswollen after 14 days in water, swelled and germ. after sand-papering.
pleurocarpa, F. v. M.	15	110	46	Sw. water.
Sophera, L.	27	125	4	All sw. water.
tomentosa, L. f.	50	22	nil	
Tora, L.	9	100	9	All sw. without filing.
Cassinia aculeata, R. Br.	54	250	nil	
arcuata, R. Br.	47	100	nil	
laevis, R. Br.	54	110	nil	
longifolia, R. Br.	47	100	nil	
spectabilis, R. Br.	54	250	nil	
Cassytha glabella, R. Br.	55	28	nil	
melantha, R. Br.	50	20	nil	
ditto	54	6	nil	Sw. after filing.
Castanospermum australe, A. Cunn.	18	20	nil	1 showed signs of life, but none germ.
ditto	25	8	nil	
Casuarina, sp.	57	50	nil	
Decaisneana, F. v. M.	14	14	nil	
quadrivalvis, Labill.	50	65	nil	
stricta, Ait.	50	14	nil	
suberosa, Otto.	12	100	62	
Caucalis nodosa, Scop.	55	43	nil	
Ceanothus americanus, L.	15	20	nil	A. de C.

	Years old.	No. of Seeds.	Per cent. Germ.	
Cedrela Toona, Roxb., var. Australis, F. v. M.	16	53	nil	
Cedronella triphylla, Moench.	50	110	nil	
Cedrus Libani, Barrel.	6	120	nil	
var. Deodara, Loud.	6	200	nil	
Celosia argentea, L.	15	20	nil	A. de C.
cristata, L.	15	20	nil	A. de C.
Celsia cretica, L. f.	57	250	nil	
Celtis occidentalis, L.	67	90	nil	
Cenia turbinata, Pers.			some	Berkeley. After 30 days in sea water.
Centaurea aspera, L., var. Isnardi, L.	50	18	nil	
australis. Bth. and Hook.	57	100	nil	
atropurpurea, Waldst. and Kit.	15	20	nil	A. de C.
calcitrapa, L.	many		some	Salter. In mud under sea water.
ditto	56	150	nil	
cyanus, L.	14	88	nil	
ditto	50	30	nil	
ditto	1400!		some	Des Moulins. Seed from a Roman tomb.
dealbata, Willd.	15	20	nil	A. de C.
ditto	50	18	nil	
Jacea, L.	53	150	nil	
sempervirens, L.	15	20	nil	A. de C.
Centranthus ruber, D. C.	50	42	nil	
ditto	15	20	nil	A. de C.
ditto	700		some	Gard. Mag. 1836. Supp. age in soil.
Cerastium oblongifolium, Torr.	67	200	nil	

	Years old.	No. of Seeds.	Per cent. Germ.	
Centrantherum punctatum. Cass.	15	20	nil	A. de C.
Centunculus minimus, L.	15	115	nil	
ditto	18?		few	Peter. Supp. age in soil.
ditto	32		few	Peter. Supp. age in soil.
ditto	77	84	nil	
ditto	48	58	nil	
ditto	57	110	nil	
Cephalaria alpina, Schrad.	50	17	nil	
leucantha, Sch.	40	140	nil	
procera, Fisch. and Ave-Lall.	50	15	nil	
rigida, Roem. and Schult.	15	20	nil	A. de C.
Cerastium arvense, L.	67	100	nil	
ditto	100?		few	Peter. Supp. age in soil.
glomeratum, Thuill.	57	1000	nil	
oblongifolium, Torr.	67	200	nil	
tetrandrum, Curt.	57	210	nil	
ditto	57	92	nil	
tetrandrum, Curt., var. atrovirens, Bab.	57	67	nil	
ditto	67	150	nil	
triviale, Link.	16	180	nil	
ditto	20?		few	Peter. Supp. time buried.
ditto	45?		few	Peter. Supp. time buried.
Ceratopetalum gummiferum, Sm.	57	50	nil	
Chaerophyllum bulbosum, L. (Tuberous Chervil).	1	100*	50	Vilmorin. Ext. limit, 2 yrs.

	Years old.	No. of Seeds.	Per cent. Germ.	
Chamaescilla corymbosa, F. v. M.	37	35	nil	
Cheiranthus Cheiri, L. (Wall Flower).	50	160	nil	
Chelidonium majus, L.	15	20	nil	A. de C.
majus, var. placiniatum	50	96	nil	
Chenopodiaceae	25		nil	Becquerel.
Chenopodium album, L.	1	67*	58	Duvel. Buried in soil 64 per cent.
ditto	28	170	nil	
ditto	20		few	Peter. Supp. time buried.
ditto	20	500	nil	
ditto	41	500	nil	
ditto	70	150	nil	
ditto	67	200	nil	
ambrosoides, L.	49	52	nil	
Bonus-Henricus, L. (Goosefoot, Good King Henry).	3	100*	50	Vilmorin. Ext. limit, 5 yrs.
ditto	43	250	nil	
Botrys, L.	21	500	nil	Same with various tests after 5 and 10 min. in acid.
ditto	16	250	nil	
capitatum, Aschers.	50	168	nil	
ditto	15	20	nil	A. de C.
ditto	72	150	nil	
ditto	49	250	nil	
ficifolium, Sm.	47	250	nil	
glaucum, L.	54	250	nil	
ditto	48	50	nil	

	Years old.	No. of Seeds.	Per cent. Germ.	
hybridum, L.	81	100	nil	
ditto	1	61*	18	Duvel. Buried in soil 13 per cent.
murale, L.	72	200	nil	
ditto	74	145	nil	
nitrariaceum, F. v. M.	57	50	nil	
opulifolium, Schrad.	43	280	nil	
ditto	43	200	nil	After 5 min. in acid.
paniculatum, Hook.	50	42	nil	
polyspermum, L.	29	400	nil	
ditto	30		nil	Becquerel.
ditto	42	300	nil	
ditto	74	150	nil	
ditto	77	200	nil	
ditto	35?		many	Peter. Supp. age in soil.
ditto	49	500	nil	
ditto	57	110	nil	
procerum, Hochst.	69	200	nil	
Quinoa. Willd. (White Quinoa).	4	100*	50	Vilmorin. Ext. limit, 5 yrs.
ditto	41	500	nil	
ditto	50	92	nil	
ditto	61	120	nil	
ditto	41	250	nil	
rubrum, L.	64	500	nil	
ditto	77	500	nil	
Chiloglottis diphylla, R. Br.	37	2000	nil	
Chloris acicularis, Lindl., var. Moorei, F. v. M.	57	100	nil	

	Years old.	No. of Seeds.	Per cent. Germ.	
truncata, R. Br.	57	100	nil	
Chorizandra enodis, Nees.	40	20	nil	
Chorizema cordatum, Lindl.	50	20	nil	
Chrysanthemum Balsamita, L.	50	145	nil	
Broussonetii, Balb.	50	25	nil	
coronarium, L.	15	20	nil	A. de C.
corymbosum, L.	15	20	nil	A. de C.
ditto	15	20	nil	
ditto	50	110	nil	
daucifolium, Pers.	15	20	nil	A. de C.
lacustre, Brot.	50	80	nil	
Leucanthemum, L.	10	34	nil	
ditto	20?		few	Peter. Supp. time in soil.
ditto	36?		few	Peter. Supp. time in soil.
ditto	50	62	nil	
ditto	1	96*	91	Duvel. Buried in soil 49 per cent.
Myconis, L.	50	96	nil	
Parthenium, Bernh.	50	120	nil	
viscosum, Desf.	50	52	nil	
Cicer arietinum, L. (Chick Pea).	3	100*	50	Vilmorin. Ext. limit, 8 yrs.
ditto	10	50	nil	
ditto	12		nil	Nobbe.
ditto	17	8	2.5	
Cichorium Endivia, L. (Endive).			some	Berkeley. After 30 days in sea water.
ditto			some	Thuret. After 13 m. floating on sea water.
ditto	10	100*	50	Vilmorin. Ext. limit, 10 yrs.

	Years old.	No. of Seeds.	Per cent. Germ.	
Intybus, L. (Common Chicory).	8	100*	50	Vilmorin. Ext. limit, 10 yrs.
ditto	12		35	Nobbe.
Circaea lutetiana, L.	61	62	nil	
ditto	67	33	nil	
Cistus, various sp.			many	D. After 36 days in sea water.
ditto			some	D. After 70 days in sea water.
hirsutus, Lam.	50	200	nil	
monspeliensis, L.	15	20	nil	A. de C.
villosus, L.	15	20	nil	A. de C.
ditto	50	100	nil	
Citriobatus multiflorus, A. C.	12	100	nil	
Citrullus Colocynthis, Sch. (Fancy Gourd)	6	100*	50	Vilmorin.
ditto	10		some	Vilmorin.
ditto	11	100	nil	Filed. Acid chars surface, and rapidly penetrates hard, unswollen seeds.
ditto	49	54	nil	
ditto	26	52	nil	6 weeks at 30 deg. C., all soft.
vulgaris, Sch. (Water Melon).	5	100*	50	Vilmorin. Ext. limit, 10 yrs.
ditto	1		nil	Duvel. If buried, died.
Cladanthus proliferus. D. C.	50	230	nil	
Cladium Filum, R. Br.	54	250	nil	
germanicum, Schrad.	64	75	nil	
germanicum, Schrad. var. mariscus, L.	58	200	nil	
Clarkia pulchella, Pursh.			many	D. After 28 days in sea water.
ditto			nil	D. After 54 days in sea water.

	Years old.	No. of Seeds.	Per cent. Germ.	
Claytonia australasica, Hook.	54	20	nil	
ditto	57	60	nil	
perfoliata, Don. (Cuban Winter Purslane).	5	100*	50	Vilmorin. Ext. limit, 7 yrs.
ditto	50	24	nil	
Clematis apiculata, Hook. f.	50	22	nil	
aristata, R. Br.	54	83	nil	
glycinoides, D. C.	54	150	nil	
microphylla, D. C.	50	14	nil	
ditto	54	19	nil	
recta, L., var. parviflora.	50	22	nil	
recta, L., var. nana.	50	52	nil	
recta, L., var. lathyrifolia, Bess.	50	52	nil	
reticulata, Walt.	50	10	nil	
virginiana, L.	67	85	nil	
Cleome graveolens, Rafin.	67	40	nil	
serrata, Jacq., var. triphylla, L.	15	20	nil	A. de C.
viscosa, L.	15	20	nil	A. de C.
Clerodendron tomentosum, R. Br.	50	13	nil	
Clethra mexicana, D. C.	18	82	nil	
Clianthus Dampieri, Cunn.	47	16	nil	
Cnicus arvensis, Hoffm.	1	57*	68	Duvel. Buried deeply, 28.5 per cent.
ditto	15	80	nil	
ditto	20?		few	Peter. Supp. time buried.
ditto	45		few	Peter. Supp. time buried.
ditto	100?		few	Peter. Supp. time buried.

	Years old.	No. of Seeds.	Per cent. Germ.	
cynaroides, Willd.	50	15	nil	
eriophorus, Roth.	15	20	nil	A. de C.
lanceolatus, Willd.	18	96	nil	
ditto	36?		few	Peter. Supp. time in soil.
ditto	57	65	nil	
oleraceus, L.	6	100*	50	Vilmorin.
syriacus, Roth.	50	33	nil	
Cochlearia acaulis, Desf.	50	50	nil	
glastifolia, L.	15	20	nil	A. de C.
ditto	50	80	nil	
officinalis, L. (Scurvy Grass).	4	100*	50	Vilmorin. Ext. limit, 7 yrs.
Cocos nucifera, L.			some	After 1 yr. floating on sea water.
plumosa, Hook.	7	30	nil	
Codonocarpus australis, A. Cunn.	10	36	nil	
cotinifolia, F. v. M.	57	100	nil	
ditto, var. pungens, Lindl.	57	50	nil	
Coffea arabica, L. (Coffee).	$\frac{1}{2}$		nil	Wiesner.
Colchicum autumnale, L.			nil	Berkeley After 1 month in sea water.
Coleanthus subtilis, Sied.	many		some	Sirodot. In soil.
ditto	34	115	nil	
ditto	42	135	nil	
Coleus scutellarioides, Benth.	15	20	nil	A. de C.
Collinsia bicolor, Benth.	50	44	nil	
grandiflora, Dougl.	50	33	nil	
parviflora, Lindl.	50	75	nil	
Collomia coccinea, Lehm.	50	32	nil	

	Years old.	No. of Seeds.	Per cent. Germ.	
grandiflora, Dougl.	50	33	nil	
linearis, Nutt.	50	156	nil	
Colutea cruenta, Ait.	50	16	nil	
halepica, Lam.	50	17	nil	
Comesperma ericinum, D. C., var. acutiflora, Steetz.	57	100	nil	
ericinum, D. C., var. linarifolia, Cunn.	54	30	10	Slight protrusion of radicle only. No complete seedlings.
retusum, Lab.	57	100	nil	
Commersonia Fraseri, J. Gay.	47	45	nil	
Conium maculatum, L.	15	20	nil	A. de C.
ditto	45	50	nil	
ditto	35	50	nil	
ditto	50	100	nil	
ditto	50	210	nil	
ditto	59	140	nil	
ditto	61	100	nil	
Conospermum Stoechadis, Endl.	9	50	nil	
Conringia orientalis, Dum.	15	20	nil	A. de C.
Convolvulaceae.	25		nil	Becquerel.
Convolvulus arvensis, L.	10	84	11	
ditto	20?		few	Peter. Supp. time buried.
ditto	55	62	nil	All sw. water.
Convolvulus arvensis, L., var. sepium.	1	4*	2	Duvel. Buried in soil 7 per cent.
ditto	10	6	nil	Sw. slowly in water.
ditto	15	20	nil	A. de C.

	Years old.	No. of Seeds.	Per cent. Germ.	
erubescens, Sims.	52	35	nil	Sw. in water.
ditto	52	12	nil	1 hr. in acid.
ditto	57	42	nil	Sw. slowly in water.
		8	nil	Sw. after 1 hr. in acid.
mauritanicus, Boiss.	10	250	37.6	45 sw. in water; all dead. Rest after ½ hr. in acid; 94 germ.
siculus, L.	50	35	nil	
tricolor, L.			many	D. After 7 days in sea water.
undulatus, Cav.	50	27	nil	
Conyza ivaefolia, Less.	47	45	nil	
Coprosma Billardieri, Hook. and C. hirtella, Lab.	47	150	nil	
Billardieri, Hook. f., var. microphylla, A. Cunn.	57	30	nil	
hirtella, Labill.	47	150	nil	
ditto	54	15	nil	
Coptis trifoliata, Salisb.	67	33	nil	
Corchorus capsularis, L.	10	500	5	
olitorius, L. (Bristly-leaved C.)	5	100*	50	Vilmorin. Ext. limit, 10 yrs.
olitorius, L.	15	20	nil	A. de C.
ditto	10	500	36	
Cordyline australis, Hook. f.	50	22	nil	
Coreopsis lanceolata, L.	83	20	nil	
ditto	50	170	nil	
Coriandrum sativum, L. (Coriander).	6	100*	50	Vilmorin. Ext. limit, 8 yrs.
sativum, L.	16		nil	Giglioli. In hydrogen.

	Years old.	No. of Seeds.	Per cent. Germ.	
Cornus Amomum, Mill., var. sericea, L.	67	55	nil	
candidissima, Mill. var. paniculata, L'Herit.	67	30	nil	
stolonifera, Michx.	67	20	nil	
Coronilla Emerus, L.	15	20	nil	A. de C.
juncea, L.	15	20	nil	A. de C.
valentina, L.	15	20	5 to 15	A. de C.
varia, L.	50	22	nil	
Corrigiola littoralis, L.	15	20	nil	A. de C.
ditto	55	52	nil	
Corydalis aurea. Willd.	16	82	nil	
ditto	50	140	nil	
bulbosa, D. C., var. digitata, Pers.	65	45	nil	
claviculata, D. C.	many		nil	Poisson.
ditto	30		nil	Becquerel.
ditto	102	50	nil	
ditto	46	60	nil	
fabacea, Pers.	67	33	nil	
glauca, Pursh.	50	188	nil	
lutea, D. C.	5	100	nil	Air dried.
pruinosa, E. Mey.	15	17	nil	
tuberosa, D.C., var. cava, S. and K.	15	1000	nil	
ditto	17	200	nil	
Corylus Avellana, L.			some	D. After 90 days floating on sea water.
rostrata, Ait.	67	10	nil	
Cosmos lutea, D. C.	fresh		nil	Berkeley. After 30 days in sea water.

	Years old.	No. of Seeds.	Per cent. Germ.	
Cotoneaster bacillaris, Wall.	50	16	nil	
buxifolia, Wall.	50	22	nil	
buxifolia, Wall, var. affinis, D. C.	50	14	nil	
buxifolia, Wall, var. marginata.	50	33	nil	
nummularia, Fisch and Mey.	50	18	nil	
thymaefolia, Hort.	50	11	nil	
ditto, var. microphylla, Wall.	50	15	nil	
Cotula Filicula, Hook. f.	54	100	nil	
Crambo hispanica, L.	15	20	nil	A. de C.
maritima, L. (Sea Kale).	1	100*	50	Vilmorin. Ext. limit, 7 yrs.
Crantzia lineata, Nutt., var. australasica.	57	41	nil	
Craspedia pleiocephala, F. v. M.	57	500	nil	
Richea, Cass.	56	1000	nil	
Crassula tetragona, L.	50	60	nil	
Crataegus aestivalis, Torr. and Gray.	50	12	nil	
coccinea, L. var. macracantha.	50	12	nil	
cordata, Ait., var. acerifolia.	50	12	nil	
Crus galli, L.	26	24	nil	
orientalis, Bieb., var. odoratissima.	50	10	nil	
Oxyacantha, L.	fresh	100	54	Shelled, and at 30 deg. C. for 2 months.
ditto	fresh	100	nil	Shelled, and at 15-20 deg. C. for 2 m.
ditto	fresh		nil	In nature. Crocker.
ditto	1		many	In nature. Crocker.
ditto	2		few	In nature. Crocker.
ditto	37	30	nil	Endocarp filed nearly through.
ditto	37	25	nil	Endocarp cracked.

	Years old.	No. of Seeds.	Per cent. Germ.	
ditto	50	14	nil	
Pyracantha, Medic.	50	10	nil	
Crepis aspera, L.	15	20	nil	A. de C.
Cressa cretica, L.	57	60	nil	
Crithmum maritimum, L. (Samphire)	1	100*	50	Vilmorin. Ext. limit, 3 years.
maritimum, L.	57	110	nil	
Crotalaria laburnifolia, L.	10	27	74	All but 3 sw. without filing.
laburnifolia, L., var. capensis.	8	28	7	
Mitchellii, Benth.	13	14	21.4	Sw. in water.
		100	78	After $1\frac{3}{4}$ hr. in acid.
Novae Hollandiae, D. C.	57	30	nil	Not quite ripe. Sw. in water.
paniculata, Willd.	20	30	nil	All sw. in water.
ramosissima, Roxb.	38		some	Becquerel.
vitellina, Ker. Gawl.	13	7	43	Sw. in water.
		100	92	Sw. after 1 hr. in acid.
Crucianella augustifolia, L.	50	104	nil	
latifolia, L.	15	20	nil	A. de C.
Cruciferae.	25		nil	Becquerel.
Cryptandra parvifolia, Turcz.	54	100	nil	
spinescens, Sieb.	57	30	nil	
Cryptocarya glaucescens, R. Br.	12	30	nil	
insignis, Bailey.	10	20	nil	
Cryptostylis longifolia, R. Br.	57	1000	nil	
Cucumis Anguria, L. (W. India Gherkin).	6	100*	50	Vilmorin. Limit over 7 yrs.
Melo, L. (Melon).			some	Berkeley. After 30 days in sea water.
ditto	1	96.5*	97	Duvel.

	Years old.	No. of Seeds.	Per cent. Germ.	
ditto	1	96.5*	nil	Buried.
ditto	5	100	64	
ditto	5	100*	50	Vilmorin. Ext. limit, 10 yrs.
Melo, L., var. flexuosus, L. (Snake Cucumber).	7 to 8	100*	50	Vilmorin. Ext. limit, 10 yrs.
Melo, L., var. Dudaim, L.	15	20	nil	A. de C.
Melo, var. serotinus, Haberl.	15	20	nil	A. de C.
prophetarum, L.	6	100*	50	Vilmorin.
sativus, L. (Cucumber).	10	100*	50	Vilmorin. Ext. limit, 10 yrs.
Cucurbita.	15		some	Poisson.
digitata, A. Gray.	13	16	nil	
maxima, Duchesne.	6	100*	50	Vilmorin. Ext. limit, 10 yrs.
moschata, Duchesne.	6	100*	50	Vilmorin. Ext. limit, 10 yrs.
Pepo, L.	fresh		some	D. After 100 days in cold sea water.
Pepo, L., var. Melo.	fresh	4	50	D. After 82 days in cold sea water.
ditto (Custard Marrow).	6	100*	50	Vilmorin. Ext. limit, 10 yrs.
ditto			some	Mart. After 93 days fl. on sea water.
ditto	fresh	100	50	Des. 42 days at 37 deg. C.
ditto	fresh	100	90	Des. 56 days to 0.87 per cent. water.
ditto	6	100*	50	Vilmorin. Ext. limit 10 yrs.
ditto	11	12	nil	
ditto	14	26	nil	
Cucurbitaceae.	25		nil	Becquerel.
Cuminum Cyminum, L. (Cumin).	1	100*	50	Vilmorin. Ext. limit, 5 yrs.
Cupania anacardioides, A. Rich.	10	33	nil	
semiglauca, F. v. M.	10	50	nil	

	Years old.	No. of Seeds.	Per cent. Germ.	
Cuphea viscosissima, Jacq.	15	20	nil	A. de C.
Cupressus Lawsoniana, Andr.	10	40	nil	
macrocarpa, H., var. Lambertiana.	8	400	nil	
ditto	10	58	nil	
sempervirens, L., var. horizontalis	50	87	nil	
sempervirens, L., var. pyramidalis	15	20	nil	A. de C.
Cuscuta australis, R. Br.	57	30	nil	
ditto, var. Polygonorum.	1	12*	8.5	Duvel. Buried deeply in soil, 13 per cent.
corymbosa, Rinz. and Pav.	8	350	8.5	
europaea, L.	10	500	5.8	
ditto	6	300	11.2	
ditto	57	80	nil	
ditto	59	100	nil	
Epilinum, Weihe.	1		nil	Duvel. Buried deeply, 34 per cent.
ditto	10	600	nil	
ditto	5	600	4.2	
Epithymum, Murr.	4	200	6.3	
ditto, var. Trifolii, Bab.	56	120	nil	
Gronovii, Willd.	9	400	12.8	
Cyathodes acerosa. R. Br.	53	40	nil	
parvifolia, R. Br.	57	10	nil	
Cyclamen latifolium, Sibth. and Sm. var. persicum, Mill.	15	20	nil	A. de C.
Cynara Cardunculus, L. (Cardoon).	7	100*	50	Vilmorin. Ext. limit, 9 yrs.
ditto	16		nil	Giglioli. In hydrogen.
ditto	6	100*	50	Vilmorin. Ext. limit, 10 yrs.

	Years old.	No. of Seeds.	Per cent. Germ.	
ditto	12		nil	Nobbe.
Cynodon Dactylon, Pers.	54	35	nil	
Cynosurus cristatus, L.	68	100	nil	
echinatus, L.	57	100	nil	
Cyperus esculentus, L.	1		nil	Duvel. If buried, died.
rotundus, L. (Nut Sedge).	3.4	100*	50	Vilmorin. Ext. limit, 5 yrs.
strigosus, L.	67	1000	nil	
Cytisus albus, Link.	13	100	31	Only 2 sw. without sand-p. Both died.
ditto	51	54	78	Most only after filing.
albus, var.	50	11	nil	
alpinus, Lam., var. Scoticus.	50	15	nil	
austriacus, L.	62		some	Becquerel.
biflorus, L. Herit.	83		some	Becquerel.
canariensis, Steud.	50	220	nil	
candicans, Lam.	80	80	2.5	Sw. in water.
	.	8	62	Sw. after 2 hr. in acid.
capitatus, Scop., var. uraliensis.	50	15	nil	
Lupinus, Gromow.	50	13	nil	
purpureus, Scop.	50	14	nil	
scoparius, Link.	50	43	nil	
sessilifolius, L.	50	15	nil	
triflorus, L. Herit.	50	3	nil	Sw. in water.
		247	18	Sw. after 4 hr. in acid.
Damasonium australe, Salisb.	57	150	nil	
australe, Salisb., var. pumilum.	57	50	nil	
stellatum, Thuill.	55	64	nil	

	Years old.	No. of Seeds.	Per cent Germ.	
Danthonia bipartita, F. v. M.	18	150	nil	
ditto	57	100	nil	
decumbens, D. C.	64	114	nil	
pilosa, R. Br.	42	86	nil	
ditto	55	20	nil	
pilosa, R. Br., var. alpina.	54	107	nil	
pilosa, R. Br., var. glabra, F. v. M.	54	60	nil	
pilosa, R. Br., var. nudiflora.	57	56	nil	
robusta, F. v. M.	54	102	nil	
Daphnandra micrantha, Benth.	15	22	nil	
Daphne Laureola, L.	81	54	nil	
Datisca cannabina, L.	15	20	nil	A. de C.
Datura Stramonium, L.	50	136	nil	
stramonium, L., var. Tatula, L.	1	99*	54	Duv. Buried deeply, 86 per cent.
ditto	15	20	nil	A. de C.
Daucus Carota, L.	fresh		10	Berkeley. After 56 days in sea water.
ditto			few	Berkeley. After 85 days in sea water.
ditto	4 to 5	100*	50	Vilmorin. Limit, over 10 yrs.
ditto	3	200	64	French grown.
ditto	3	200	35	English grown.
Carota, L., Long Horn.	12	250	nil	
Carota, L., Early Scarlet.	13	420	nil	
Carota, L.	20?		few	Peter. Supp. time in soil.
ditto	36?		few	Peter. Supp. time in soil.
Daviesia cordata, Sm.	67	150	1.3	98 sw. and 2 germ. only after sand-p
corymbosa, Sm., var. virgata.	55	15	nil	All sw. in water.

	Years old.	No. of Seeds.	Per cent. Germ.	
crenulata, Turcz., var. parviflora.	18	17	59	In acid 3 hr.
ditto	18	15	33	Sw. in water.
Delphinium Consolida, Linn.	50	92	nil	
Dendrocalamus giganteus, Munro.	13	250	nil	
Hamiltonii, Rees and Arn.	15	34	nil	
Desmanthus brachylobus, Benth.	15	20	5-15	A. de C.
Deyeuxia Forsteri, Kunth.	55	200	nil	
frigida, F. v. M.	54	80	nil	
Mulleri, Benth.	57	200	nil	
nivalis, Benth.	54	100	nil	
quadriseta, R. Br.	57	67	nil	
scabra, Kunth.	54	48	nil	
ditto	54	150	nil	
Dianella longifolia, R. Br.	47	210	nil	
ditto	50	60	nil	
revoluta, R. Br.	40	62	nil	
tasmanica, Hook. f.	18	13	nil	
Dianthus barbatus, L.	50	52	nil	
Carthusianorum, L.	50	56	nil	
plumarius, L.	50	48	nil	
ditto	50	44	nil	
Dichelachne crinita, Hook. f.	55	100	nil	
Digitalis lanata, Ehrh.	15	20	nil	A. de C.
lutea, L., var. intermedia, Pers.	15	20	nil	A. de C.
orientalis, Lam.	15	20	nil	A. de C.
purpurea, L.	15	20	nil	A. de C.

	Years old.	No. of Seeds.	Per cent. Germ.	
ditto	50	149	nil	
ditto	30		nil	Becquerel.
Dillwynia ericifolia, Sm.	12	100	68	After 2½ hr. in acid nearly all sw.
ditto	25	120	22	Sw. after 3 hr. in acid.
ericifolia, Sm., var. glaberrima.	50	7	nil	
floribunda, Sm.	12	50	46	After 1 hr. in acid.
ditto	32	64	19	All sw. after 2 hr. in acid.
Dimorphotheca pluvialis, Moench.	50	47	nil	
Dioclea pauciflora, Rusby.*	64		some	Becquerel.
Diplotaxis, pendula, D. C.	53	1000	nil	
tenuifolia, D. C.	18	250	nil	
ditto	40	500	nil	
viminea, D. C.	45	150	nil	
Diplothemium maritimum, Mart.	8	11	nil	
Dipsacus fullonum, L.	15	20	nil	A. de C.
ditto	16	48	nil	
ditto	65	50	nil	
pilosus, L.	30	55	nil	
ditto	55	46	nil	
ditto	60	62	nil	
sylvestris, Mill.	22	84	nil	
ditto	50	25	nil	
Discaria australis, Hook.	55	45	nil	
Distichlis maritima, Rafin.	57	200	nil	
Diuris sulphurea, R. Br.	57	800	nil	

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* Doubtful record, since, according to Kew Index, the plant was only described (Mem. Torr. Bot. Club, vi., 25), at a much later date.

	Years old.	No. of Seeds.	Per cent. Germ.	
Dodonaea attenuata, A. Cunn., var. Preissiana, Miq.	57	100	nil	
ditto	50	28	nil	
lobulata, F. v. M.	47	20	nil	Filed.
viscosa, Jacq., var. asplenifolia.	57	55	nil	
asplenifolia, Rudge., var. conferta.	57	100	nil	
Dolichos biflorus, L.	47	65	nil	All sw. in water.
ditto	47	14	nil	All sw. in water.
brasiliensis	15	20	5 to 15	A. do C.
falcatus, Klein.	10	22	nil	
funarius, Moll.	37		some	Becquerel.
Lablab, L.	3	100*	50	Vilmorin. Ext. limit, 8 yrs.
ditto	10	67	8	
ditto	41	8	nil	All sw. in water.
ditto	50	9	nil	
Lablab, L., var. lignosus.	50	33	nil	
Lablab, Linn., var. purpureus.	10	20	nil	
surinamensis ?	12		nil	Nobbe.
Doronicum austriacum, Jacq.	50	100	nil	
Doryanthes excelsa, Correa.	11	40	nil	
Drimys aromatica, F. v. M.	54	68	nil	
Drosera longifolia, L.	67	148	nil	
rotundifolia, L.	20	122	nil	
Drymophila cyanocarpa, R. Br.	50	20	nil	
Duboisia myoporoides, R. Br.	10	70	1.4	
ditto	15	120	nil	

	Years old.	No. of Seeds.	Per cent. Germ.	
Duranta Plumieri, Jacq.	50	20	nil	
Dysodia chrysanthemoides, Lag.	15	20	nil	A. de C.
Dysoxylum rufum, Benth.	57	30	nil	
Ecballium Elaterium, A. Rich.	44	100	nil	
Echinopogon ovatus, Beauv.	57	100	nil	
Echinospermum Lappula, Lehm.	15	20	nil	A. de C.
Echium violaceum, L.	50	45	nil	
vulgare, L.	300		nil	Nobbe. Old herb.
Eclipta erecta, Linn.	15	20	nil	A. de C.
Eichornia, sp.	ripe		nil	Coats intact. Crocker.
ditto	ripe		98	Coats broken. Crocker.
Elaeocarpus cyaneus, Sims.	57	32	nil	
eumundi, F. M. Bailey	12	35	nil	
ovalis, Miq.	50	20	nil	
Eleocharis obtusa, Schult.	67	140	nil	
ovata, R. Br.	many		some	Sirodot. Supp. age in soil.
ditto	25	180	nil	
Elephantopus scaber, L.	15	20	nil	A. de C.
Eleusine aegyptiaca, Desf.	12	500	nil	
aegyptiaca, Desf., var. cruciata.	8	250	12	In 2 to 14 weeks, without filing.
ditto	18	170	nil	
coracana, Gaertn.	10	1000	nil	
ditto	15	20	nil	A. de C.
indica, Gaertn.	1	78*	75	Duvel. Buried in soil ; all died.
oligostachya, Link.	45	500	nil	
stricta, Roxb.	13	400	nil	Sand-p.

	Years old.	No. of Seeds.	Per cent. Germ.	
Ellisia Nyctelea, Linn.	15	20	nil	A. de C.
Elymus canadensis, L.	1	93.5*	95.5	Duvel. Buried deeply, 22 per cent.
condensatus, J. and C. Presl., var. triticoides, Buckl.	1	84*	75	Duvel. Buried deeply, 15.5 per cent.
virginicus, L.	1	65*	44	Duvel. Buried Deeply, 25.5 per cent.
Emex Australis, Steinh., var. Centropodium, Meissn.	57	60	nil	
spinosa, Campd.	15	20	5-15	A. de C.
Enchylaena tomentosa, R. Br.	47	40	nil	
Endiandra Sieberi, Nees.	+10	3	nil	Large seed.
Entada Pursaetha, D. C.	years		some	Hemsley. Several years in sea water.
ditto	33	8	nil	Water very slowly absorbed through scar.
scandens, Benth.	+10	2	50	
ditto	fresh		some	Guppy. After months on sea water.
Entelea arborescens, R. Br.	51	76	47.3	In 12 weeks, without filing.
Epacris heteronema, Labill.	22	250	nil	
ditto	54	500	nil	
ditto	57	200	nil	
lanuginosa, Labill.	18	52	nil	
ditto	57	500	nil	
microphylla, R. Br.	20	110	nil	
ditto	57	400	nil	
obtusifolia, Sm.	24	84	nil	
ditto	57	300	nil	
Epaltes australis, Less.	57	100	nil	
Ephedra distachya, Linn.			some	Mart. After 93 days fl. on sea water.

	Years old.	No. of Seeds.	Per cent. Germ.		
Epilobium alpinum, L.	50	53	nil		
angustifolium, L.	55	1000	nil		
ditto	58	200	nil		
Billardierianum, Ser.	57	100	nil		
ditto	57	100	nil		
Billardierianum, var. micranthum.	57	200	nil		
hirsutum, L.	many		many	Salter.	In mud under sea water.
ditto	10	140	nil		
ditto	15	20	nil	A. de C.	
ditto	58	200	nil		
Lamyi, F. Schultz.	55	110	nil		
montanum, Linn.	14	260	nil		
ditto	36?		few	Peter.	Supp. time in soil.
ditto	42	210	nil		
ditto	45?		some	Peter.	Supp. time buried.
ditto	100?		many	Peter.	Supp. age in ground.
roseum, Schrad.	61	64	nil		
Eragrostis amabilis, Wight and Arn., var. polymorpha.	57	114	nil		
Brownii, Nees.	54	118	nil		
lacunaria, F v. M.	18	100	nil		
ditto	57	100	nil		
pilosa, Beauv., var. parviflora.	54	500	nil		
ditto	15	20	nil	A. de C.	
ditto	15	20	nil	A. de C.	
Ercilla volubilis, A. Juss.	50	26	nil		

	Years old.	No. of Seeds.	Per cent. Germ.	
Eremophila bignoniflora, F. v. M.	47	50	nil	
polyclada, F. v. M.	57	100	nil	
Erianthus strictus, Baldw.	15	20	nil	A. de C.
Erigeron acris, L.	22	240	nil	
ditto	55	500	nil	
canadensis, L.	12	160	nil	
ditto	56	1000	nil	
conyzoides, F. v. M.	17	1200	nil	
ditto	57	300	nil	
glabellus, Nuth.	50	86	nil	
Eriophorum angustifolium, Roth.	58	59	nil	
gracile, Koch.	64	100	nil	
latifolium, Hoppe.	55	99	nil	
polystachion, L.	67	88	nil	
vaginatum, L.	56	52	nil	
Eriostemon ozothamnoides, F. v. M.	57	120	nil	
phylicoides, F. v. M.	57	38	nil	
pungens, Lindl.	57	82	nil	
sediflorus, F. v. M.	57	150	nil	
trachyphyllus, F. v. M.	57	42	nil	
Erodium cicutarium, L. Herit., var. melanostigma.	15	20	nil	A. de C.
ditto, var. pimpinellaefolium, Sibth.	15	20	nil	A. de C.
maritimum, Sm.	57	52	nil	
laciniatum, Willd, var. pulverulentem.	15	20	nil	A. de C.

	Years old.	No. of Seeds.	Per cent. Germ.	
moschatum, L. Herit.	38	125	nil	
ditto	55	130	nil	
ditto	59	120	nil	
Eruca sativa, Mill. (Rocket).	4	100*	50	Vilmorin. Ext. limit, 9 yrs.
Eryngium giganteum, Bieb., var. asperifolium.	15	20	nil	A. de C.
maritimum, L.			some	Mart. After 45 days fl. on sea water.
ditto	65	132	nil	
Erysimum asperum, D. C., var. arkansanum.	10	250	nil	
cheiranthoides, L.	1	52*	42	Duvel. Buried deeply, 8 per cent.
ditto	15	100	nil	
cuspidatum, D. C.	15	20	nil	A. de C.
pannonicum, Crantz, var. strictum.	15	20	nil	A. de C.
Perofskianum, Fisch. and May.	fresh		many	D. After 36 days in sea water.
ditto		100	2	D. After 50 days in sea water
ditto			nil	D. After 70 days in sea water.
Erythraea Centaurium. Pers.	10	180	nil	
ditto	16	210	nil	
ditto	30	250	nil	
ditto	100?		few	Peter. Supp. age in soil
linarifolia, Pers., var. littoralis.	56	210	nil	
ramosissima, Pers., var. pulchella	37	1500	nil	
ditto	57	250	nil	
Erythrina indica, Lam.	8	44	48	Sw. after filing.
		6	nil	Sw. in water.

	Years old.	No. of Seeds.	Per cent. Germ.	
ditto	32	63	7	Sw. after 3 hr. in acid.
Vespertilio, Benth.	15	20	25	After 3 hr. in acid.
Erythronium Dens-canis, L.	3	100	nil	Air dried.
Erythroxylum Coca, Lam.	17	15	nil	
Eschscholzia californica, Chan.	fresh		few	Berkeley. After 30 days in sea water.
ditto	50	82	nil	
Eucalyptus alpina, Lindl.	57	130	nil	
amygdalina, Labill.	11	1500	4.1	
botryoides, Sm.	10	10,000	8.5	
calophylla, R. Br.	10	120	96	
ditto	15	60	75	
ditto	20	32	12.5	
ditto	32	100	5	
ditto	50	45	nil	
coccifera, Hook. f.	11	1500	3.2	
cornuta, Lab.	10	2000	27	
ditto	22	180	9	
ditto	35	128	nil	
corynocalyx, F. v. M.	10	10,000	2.2*	
ditto	25	500	nil	
diversicolor, F. v. M.	14	100	86	Germ. in 5 days at 22 deg. C.
ditto	24	200	11	

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* Eucalyptus. On re-testing with thinner sowing and removing seedlings daily, the percentages were approximately doubled. All the seeds were soaked and germinated in 3-15 weeks at 20 deg. C-33 deg. C. Where the older seed had a higher percentage than the lower, this appeared in all cases to be due to the latter containing a higher original percentage of infertile seed. No Eucalyptus seed appeared to have completely impermeable coats, though many absorbed water only slowly.

	Years old.	No. of Seeds.	Per cent. Germ.	
Eucalyptus diversicolor	50	150	nil	
dumosa, A. Cunn.	57	250	nil	
foecunda, Schau.	10	10,000	3.9*	
ditto	25	2000	nil	
globulus, Labill.	fresh	200	75	56 days in des. at 37 deg. C.
ditto	10	10,000	4.4*	
ditto	10	500	3	
ditto	20	1000	2.2	
ditto	32	500	nil	
gomphocephala, D. C.	30	2000	0.8	
ditto	45	550	nil	
goniocalyx, F. v. M.	10	5000	11	
ditto	15	2000	4	
Gunnii, Hook. f.	11	2500	2.2	
ditto	28	1200	nil	
ditto	57	250	nil	
incrassata, Lab., var. costata.	57	200	nil	
largiflorens, F. v. M.	57	83	nil	
leptopoda, Benth.	30	100	1.2	
ditto	45	500	nil	
miniata, A. Cunn.	13		some	Elliot. In Mueller's Eucalyptographia.
ditto	15	1000	4.3	
ditto	20	850	2.2	
ditto	48	280	nil	
obcordata, Turcz.	10	10,000	6.5	
ditto	15	500	8.2	

	Years old.	No. of Seeds.	Per cent. Germ.	
Eucalyptus obliqua, L. Herit.	fresh	200	68	Des. 56 days at 37 deg. C.
ditto	13	100	22	
ditto	21	200	nil	
ditto	25	180	1.1	
ditto	46	250	nil	
occidentalis, Endl.	57	200	nil	
odorata, Behr.	7	100	15	
ditto	10	200	10	
ditto	57	300	nil	
pauciflora, Sieber.	10	1000	7.2	
ditto	12	5000	5.8	
ditto	50	250	nil	
ditto, var phlebophylla.	54	250	nil	
paniculata, Sm.	10	10,000	4.3*	
patens, Benth.	10	5000	8.1	
pilularis, Sm.	11	500	25.6	
ditto	50	250	nil	
polyanthema, Sch.	54	31	nil	
punctata, D. C.	7	1200	18.2	
ditto	15	600	7	
ditto	10	3000	22	
ditto	15	10,000	7.5	
rostrata, Sch.	7	1000	28.5	
ditto	10	8000	8.3	
ditto	37	2000	6.1	
ditto	50	220	nil	

	Years old.	No. of Seeds.	Per cent. Germ.	
Eucalyptus rudis, Endl.	10	10,000	12	
ditto	50	280	nil	
siderophloia, Benth.	10	10,000	2.1*	
Stuartiana, F. v. M.	25	100	nil	
tereticornis, Sm.	10	5000	8.2	
ditto	15	850	2.3	
urnigera, Hook. f.	11	1200	5.5	
ditto	57	520	nil	
viminalis, Labill.	10	10,000	11	
ditto	12	500	15	
ditto	17	100	nil	
ditto, var. fabrorum, Sch.	40	250	nil	
ditto	57	150	nil	
Eucharidium concinnum, Fisch. and Mey.	50	100	nil	
Euchlaena mexicana, Schrad.	13	14	nil	Remained undecomp. many weeks.
Eugenia Smithii, Poir.	10	30	nil	
Euonymus atropurpureus, Jacq.	50	30	nil	
europaeus, L., var. coccinea.	50	15	nil	
europaeus, L., var. latifolius.	50	12	nil	
europaeus, L., var. variegatus.	50	13	nil	
Eupatorium ageratoides, L. f.	12	130	nil	
ditto	67	140	nil	
cannabinum, L.	15	20	nil	A. de C.
purpureum, L.	16	250	nil	
ditto	67	280	nil	
sessilifolium, L.	15	20	nil	A. de C.

	Years old.	No. of Seeds.	Per cent Germ.	
Euphorbiaceae	25		nil	Becquerel.
Euphorbia Chamaesyce, L.	15	20	nil	A. de C.
ditto	57	88	nil	
ditto	57	100	nil	
Characias, L.	50	24	nil	
eremophila, A. Cunn. (deserticola).	57	10	nil	
exigua, L.	20	150	nil	
ditto	22?		few	Peter. Supp. age in soil.
ditto	55	28	nil	
helioscopia, L.	10	90	12	
ditto	20?		few	Peter. Supp. time buried.
ditto	28	35	nil	
ditto	36?		few	Peter. Supp. time in soil.
hypericifolia, L.	15	20	nil	A. de C.
Lathyris, L.	30		nil	Becquerei.
ditto	50	57	nil	
Paralias, L.	fresh		some	Mart. After 45 days fl. on sea water.
ditto	58	45	nil	
Peplus, L.	36?		few	Peter. Supp. age in soil.
ditto	57	100	3	After long soaking, rest died.
ditto	67	27	nil	
pilosa, L.	56	28	nil	
platyphyllus, L.	60	32	nil	
Terracina, L.	15	20	nil	A. de C.
Euphrasia alpina, R. Br.	57	50	nil	
Eustrephus latifolius, R. Br., var. Brownii.	10	82	nil	

	Years old.	No. of Seeds.	Per cent. Germ.	
latifolius, R. Br.	50	13	nil	
ditto	57	15	nil	In acid ½ hr.
Eutaxia empetrifolia, Sch.	57	50	8	Berkeley. After 30 days in sea water.
Eutoca viscida, Torr.	fresh		nil	
ditto	50	65	nil	
Exocarpus latifolius, R. Br.	67	55	nil	
Fagelia bituminosa, D. C.	50	16	nil	
Fagopyrum esculentum, Moench.	1	100*	98.5	Duvel. If buried, all died.
tataricum, Gaertn.	15	20	nil	A. de C.
ditto	12		nil	Nobbe.
Fagus sylvatica, L.	12	54	nil	
ditto	50	13	nil	
Fedia Cornucopiae, Gaertn.	4	100*	50	Vilmorin Ext. limit, 7 yrs.
ditto	10		nil	
ditto			some	Berkeley. After 30 days in sea water.
ditto	50	59	nil	
ditto, var. graciliflora.			some	Berkeley. After 30 days in sea water.
Felicia angustifolia, Nees.	50	59	nil	
Ferraria undulata, L.	50	17	nil	
Festuca delicatula, Lag.	15	20	nil	A. de C.
elatior, Linn.	1	97*	83	Duvel. Buried deeply, 0.5 per cent.
ditto	8	100	nil	
elatior, Linn., var. pratensis, Linn.	fresh		26	Nobbe.
ditto	3		9	
ditto	12	200	nil	
littoralis, Labill.	14	88	nil	

	Years old.	No. of Seeds.	Per cent. Germ.	
ditto	15	20	nil	A. de C.
ditto	54	100	nil	
Loliacea, Huds.	66	86	nil	
nutans, Spreng.	67	140	nil	
ovina., L., var. heterophylla, Wahlenb.	12		nil	Nobbe.
ovina, L.	fresh		21	Nobbe.
ditto	3		7	Nobbe.
ditto	10	120	nil	
rigida, Kunth.	55	150	nil	
ditto	60	61	nil	
rubra, L.	fresh		23	Nobbe.
ditto	3		6	Nobbe.
ditto	13	150	nil	
tenella, Willd.	16	200	nil	
ditto	67	50	nil	
Ficus macrophylla, Desf.	7	1500	nil	
rubiginosa, Desf., var. australis.	12	250	nil	
ditto	57	50	nil	
rubiginosa, Desf.	12	250	nil	
ditto	17	250	nil	
Filago minima, Fries.	14	300	nil	
ditto	45?		few	Peter. Supp. time buried.
ditto	50	250	nil	
Flaveria Contrayerba. Pers.	15	20	nil	A. de C.

	Years old.	No. of Seeds.	Per cent. Germ.	
repanda, Lag.	15	20	nil	A. de C.
Flindersia australis, R. Br.	12	30	3.3	
ditto	25	38	nil	
Foeniculum vulgare, Mill. (Fennel).	fresh		many	D. C. Cooled 100 times to 50 deg. C.
vulgare (Bitter fennel).	4	100*	50	Vilmorin. Ext. limit, 7 yrs.
ditto	10	150	nil	
ditto	61	180	nil	
vulgare, var. (Long fennel).	4	100*	50	Vilmorin. Ext. limit, 7 yrs.‡
ditto	12	100	nil	
vulgare (Florence fennel).	4	100*	nil	Vilmorin. Ext. limit, 5 yrs.
ditto	15	250	nil	
Fragaria vesca, L. (Strawberry)	3	100*	50	Vilmorin. Ext. limit, 6 yrs.
ditto	11	400	nil	
ditto	35?		few	Peter. Supp. age in soil.
ditto	36?		few	Peter. Supp. age in soil.
ditto	45?		few	Peter. Supp. age in soil.
ditto	55	142	nil	
ditto	67	80	nil	
ditto	100?		few	Peter. Supp. age in soil.
Francoa sonchifolia, Cav.	50	200	nil	
Frankenia pulverulenta, L.	15	20	nil	A. de C.
Fraxinus americana, L.	1	49.5*	2	Duvel. Buried deeply, 84 per cent.
Fritillaria Imperialis, L.	50	25	nil	
Fugosia cuneiformis, Benth.	30	200	nil	Sw. in water.

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‡ In all the Vilmorin records the number 50 in the germination column means that more than half the seeds originally germinable retained the power of germination at the age given.

	Years old.	No. of Seeds.	Per cent. Germ.	
Fumaria densiflora, var. micrantha, D. C.	56	120	nil	
officinalis, L.	18	78	nil	
parviflora, Lam.	55	80	nil	
Gagea pusilla, Schult. f., var. arvensis.	5	100	nil	Air dried.
Gahnia psittacorum, Lab.	33	100	nil	
Galega orientalis, Lam.	51	48	2	Sw. in soaking.
Galeopsis Ladanum, L.	55	71	nil	
Tetrahit, Linn., var. bifida.	110?		few	Peter. Supp. age in soil.
ditto	18	66	nil	
versicolor, Curt.	15	20	nil	
Galinsoga parviflora, Cav.	12	250	nil	
ditto	50	580	nil	
Galium, sp.	14	51	nil	
anglicum, Huds.	30		nil	Becquerel.
ditto	cent'r's		some	Michalet.
anisophyllum, Vill.	46	140	nil	
Aparine, Linn. (Vaillantii).	50	27	nil	
ditto	32	138	nil	
arenarium, Labill.	48	58	nil	
ditto	59	58	nil	
australe, D. C.	57	30	nil	
parisiense, Linn., var. anglicum.	14	62	nil	
ditto	many		some	Michalet. In soil
ditto	52	3000	nil	
pedemontanum, All.	50	180	nil	
rubioides, Linn.	50	23	nil	

	Years old.	No. of Seeds.	Per cent. Germ.	
saxatile, L.	46	65	nil	
ditto	50	85	nil	
ditto	100?		few	Peter. Supp. age in soil.
spurium, L.	15	20	nil	A. de C.
sylvaticum, L.	70	130	nil	
sylvaticum, L., var. capillipes,	50	51	nil	
tricorne, Stokes.	17	94	nil	
ditto	20?		few	Peter. Supp. time in soil.
ditto	55	110	nil	
Gardenia, sp.	20	210	nil	
Garuleum viscosum, Cass.	15	20	nil	A. de C.
Gastridum australe, Beauv., Gard., var. lendigerum.	62	100	nil	
Gaultheria hispida, R. Br.	57	400	nil	
Gaylussacia dumosa, Torr. and Gray.	57	28	nil	
Geitonoplesium cynosum, A. Cunn.	57	82	nil	
Genista aethnensis, D. C.	50	12	nil	
anglica, L.	42	9	nil	Sw. in water.
		10	20	Sw. after 1 hr. in acid.
ditto	74	15	nil	Sw. after 1 hr. in acid.
hispanica, L.	50	11	nil	
pilosa, L.	50	18	nil	
radiata, Scop.	50	7	nil	
Spachiana, Webb.	51	82	2.4	Sw. after long soaking.
ditto	88	20	nil	
virgata, Link.	50	6	nil	

	Years old.	No. of Seeds.	Per cent. Germ.	
Gentiana asclepiadea, Linn.	15	20	nil	A. de C.
montana, Forst. f.	53	125	nil	
Geococcus pusillus, J. Drum.	10	100	nil	
ditto	15	300	nil	
ditto	18	100	nil	
ditto	20	200	nil	
ditto	23	100	nil	
ditto	31	100	nil	
Geranium asphodeloides, Burm., var. nemorosum, Tenore	50	17	nil	
dissectum, L., var. parviflorum.	57	10	nil	
dissectum, L., var. pilosum.	57	50	nil	
dissectum, L., var. potentilloides.	54	50	nil	28 sw. in water, rest after ½ hr. acid
lucidum, L.	50	73	nil	
molle, L.	59	48	nil	
pyrenaicum, Burm. f.	55	62	nil	
sessiliflorum, Cav., var. brevicaule.	57	50	nil	
Gerardia quercifolia, Pursh.	50	100	nil	
Geum coccineum, Sibth. and Sm.	50	53	nil	
coccineum, var. splendens.	fresh		many	D. After 36 days in sea water.
ditto	fresh		1	D. After 70 days in sea water.
Gilia capitata, Sims.	50	32	nil	
micrantha, Steud.	50	80	nil	
multicaulis, Benth.	50	225	nil	
ditto, var. millefoliata.	50	130	nil	
squarrosa, Hook. and Arn.	20	50	nil	

	Years old.	No. of Seeds.	Per cent. Germ.	
ditto	18	100	nil	
tricolor, Benth.			nil	Berkeley. After 30 days in sea water.
Ginkgo biloba, Linn.			some	Mart. After 45 days floating on sea water.
Glaucium corniculatum, Curt.	50	62	nil	
flavum	50	180	nil	
flavum, Crantz., var. luteum, Scop.	14	250	nil	
ditto	1000		some	White. Supp. age in soil.
Serpieri, Heldr.	1500		some	V. Heldreich. Supp. ago in soil.
Glyceria aquatica, Wahlenb.	57	500	nil	
ditto	67	1000	nil	
fluitans, R. Br.	55	100	nil	
Hookeriana, F. v. M.	57	81	nil	
ramigera, F. v. M.	57	60	nil	
Glycine clandestina, Wendl.	37	4	nil	
Soja, Sieb. et Zucc. (Sojabean).	2	100*	50	Vilmorin. Ext. limit, 6 yrs.
ditto	50	82	nil	
ditto	10	50	nil	
tabacina, Benth.	50	30	nil	
Gmelina Leichardtii, F. v. M.	15	21	nil	
Gnaphalium japonicum, Thunb., var. involucratum.	50	250	nil	
purpureum, Linn.	67	250	nil	
supinum, L.	56	50	nil	
sylvaticum, L.	12	250	nil	
ditto	15	20	nil	A. do C.

	Years old.	No. of Seeds.	Per cent. Germ.	
ditto	18?		few	Peter. Supp. age in soil.
ditto	50	500	nil	
uliginosum, L.	16	250	nil	
ditto	18?		some	Peter. Supp. age in soil.
ditto	35?		many	Peter. Supp. age in soil.
ditto	36?		few	Peter. Supp. time in soil.
ditto	45?		few	Peter. Supp. time in soil.
ditto	77	1200	nil	
ditto	53	1500	nil	
ditto	100?		some	Peter. Supp. time in soil.
Gnetum Gnemon, L.			some	Hemsley. After months in sea water.
Goldbachia laevigata, D. C., var. torulosa.	12		nil	Nobbe.
Gompholobium latifolium, Sm.	12	100	22	2 hr. in acid.
ditto	22	80	5	Sw. after 2 hr. in acid.
ditto	59	63	nil	
minus, Sm., var. tetrathecoides, Sieb.	50	11	nil	Sw. in water.
ditto	50	38	5.2	After 1 hr. in acid.
ditto	61	50	2	Sw. after 1 hr. in acid.
Goodenia cycloptera, R. Br.	57	110	nil	
heteromera, F. v. M.	57	13	nil	
pinnatifida, Schlecht.	57	80	nil	
varia, R. Br.	57	80	nil	
Goodia lotifolia, Salisb.	8	50	84	2 hr. in acid, 10 sw. in water, 9 germ.; after a second 2 hr. in acid 40 sw. and 32 germ.

	Years old.	No. of Seeds.	Per cent. Germ.	
ditto	51	19	10.5	After 2 hr. in acid.
ditto	57	220	45	58 sw. in water without filing. Of these 11 germ. After slight filing, 10 sw. and 7 germ. Remaining 152 in acid for 1hr.; all sw. and 74 germ.
ditto	105	26	7.7	16 sw. and decayed; 10 sw. and, after filing, 2 germ. (Coll. by R. Brown.)
lotifolia, Salisb., var. medicaginea.	50	16	25	After 3 hr. in acid.
ditto	57	8	nil	Sw. in water.
ditto	57	10	30	Sw. after 6 hr. in acid.
ditto	59	20	5	Sw. in water.
ditto	59	27	30	Sw. after 6 hr. in acid.
Gossypium herbaceum, L.	10	8	nil	
herbaceum, L., var. hirsutum, L.	1	77.5*	72	Duvel. Of buried seed none germ.
Sturtii, F. v. M.	10	28	80	2 sw. and germ. after soaking. Rest sw. after 1 hr. in acid and 14 germ.
ditto	22	28	14	Sw. after 1 hr. in acid.
Gramineae.	25		nil	Becquerel.
Grevillea alpina, Lindl., var. Dallachiana.	50	12	nil	
ditto	57	29	nil	
australis, R. Br.	57	44	nil	
Caleyi, R. Br.	57	30	nil	
ericifolia, R. Br., var. Latrobei.	50	80	nil	
Kennedyana, F. v. M.	10	45	nil	
robusta, A. Cunn.	8	30	nil	
robusta, A. Cunn	57	22	nil	

	Years old.	No. of Seeds.	Per cent. Germ.	
Grindelia squarrosa, Dunal.	1	26*	41	Duvel. Buried deeply, 42 per cent germ
Guizotia abyssinica, Cass., var. oleifera.	13	200	nil	
ditto	47	30	nil	
ditto	50	28	nil	
Gunnera chilensis, Lam., var. scabra.	50	12	nil	
Gypsophila scorzonerifolia, Ser.	15	20	nil	A. de C.
Haematoxylon campechianum, L.	8	18	nil	
Hakea acicularis, Knight.	50	18	nil	
ditto, var. brachyrrhyncha.	32	46	nil	
ditto	51	2	nil	
bipinnatifida, R. Br.	50	14	nil	
cycloptera, R. Br.	10	5	60	
gibbosa, Lav.	50	13	nil	
lissocarpha, R. Br.	30	14	nil	
microcarpa, R. Br.	57	20	nil	
microcarpa, R. Br., var. bifrons.	57	13	nil	
nodosa, R. Br.	37	20	nil	
nodosa, R. Br., var. flexilis, R. Br.	57	7	nil	
ditto	54	10	nil	
pugioniformis, Cav.	57	7	nil	
rostrata, F. v. M.	50	20	nil	
ditto	57	20	nil	
saligna, Knight.	57	14	nil	
subsulcata, Meissn.	41	14	nil	
ulicina, R. Br.	55	20	nil	
ulicina, R. Br., var. carinata.	57	12	nil	

	Years old.	No. of Seeds.	Per cent. Germ.	
ditto	50	40	nil	
undulata, R. Br.	50	13	nil	
vittata, R. Br.	55	15	nil	
Haloragis acutangula, F. v. M.	57	62	nil	
glauca, Lindl.	57	20	nil	
mucronata, Benth.	57	100	nil	
odontocarpa, F. v. M.	57	84	nil	
Hardenbergia monophylla, Benth.	50	27	18.5	10 unsw. after 5 months in soil. Of these 5 germ. after filing.
monophylla, Benth., var. alba.	51	13	15.4	3 unsw. after 5 m. in soil. Of these 2 germ. after a week's soaking in water at 30-40 deg. C.
Harpullia, sp.?	47	20	nil	
pendula, Planch	16	20	nil	
Hebenstretia dentata, L.	50	240	nil	
Hedycarya angustifolia, A. Cunn., var. Pseudo-morus, Forst.	50	47	nil	
ditto	57	42	nil	1 hr. in acid.
ditto	57	42	nil	Kept moist 10 weeks.
arborea, Forst., var. dentata.	17	70	nil	
Hedysarum elongatum, Fisch.	50	19	nil	
Helianthemum canadense, Michx.	67	200	nil	
glaucum, Pers., var. croceum.	50	11	nil	
guttatum, Mill.	50	400	nil	
oelandicum, Wahlenb., var. marifolium, Bess.	50	30	nil	

	Years old.	No. of Seeds.	Per cen Germ.	
polifolium, D. C., var. hyssopifolium, Tenore.	50	15	nil	
ditto, var. roseum.	50	12	nil	
salicifolium, Mill.	15	20	nil	A. de C.
vulgare, Gaertn, var. serpyllifolium.	50	30	nil	
Helianthus annuus, L. (Sunflower).	fresh	100	33	1 h. at 100 deg. C., dry.
ditto	1	97*	96.5	Duvel. Buried, all died.
ditto	1	100	97	Duvel. Buried deeply, 66 per cent.
ditto	15	20	nil	A. de C.
ditto	50	14	nil	
ditto	fresh	100	51	Des. 42 days at 37 deg. C.
ditto	51	500	nil	
californicus, D. C.	50	27	nil	
pubescens, Rafin.	15	20	nil	A. de C.
strumosus, Linn.	67	86	nil	
Helichrysum adnatum, Benth.	50	320	nil	
baccharoides, F. v. M.	57	300	nil	
bracteatum, Andr.	50	90	nil	
cinereum, F. v. M.	57	2000	nil	
cuneifolium, F. v. M.	57	1000	nil	
diosmaefolium, Sweet.	15	160	nil	
ditto	57	850	nil	
lucidum, Henckel.	10	800	nil	
pholidotum, F. v. M.	57	1000	nil	
reticulatum, Less.	57	250	nil	

	Years old.	No. of Seeds.	Per cent. Germ.	
semipapposum, D C.	57	220	nil	
subulifolium, Harv.	6	100	44	
ditto	22	100	nil	
Heleiocharis ovata, R. Br.	many		some	Sirodot. In soil.
ditto	18	250	nil	
ditto	57	110	nil	
ditto	43	50	nil	
Heliotropium europaeum, L.. var. vulgare.	18	200	nil	
ditto	24	150	nil	
ditto	1400?		some	Des Moulins. Seed from a Roman tomb.
Helipterum dimorpholepis, Benth.	37	200	nil	
incanum, D. C., var. albicans.	10	250	4.8	
roseum, Benth.	10	300	5	
ditto	7	140	5	
ditto	17	150	nil	
ditto	50	40	nil	
ditto	50	280	nil	
Heracleum candicans, Wall.	50	15	nil	
Heritiera littoralis, Ait.			some	Hemsley. Many m. fl. on sea water.
Hermannia angularis, Jacq.	51	200	23	Within 5 months, without filing.
denudata, Linn. f.	70	20	nil	
ditto	83	50	nil	
Gerardii, Harv.	16	56	nil	All sw. in water.
hyssopifolia, L.	46	120	nil	
Sandersonii, Harv.	12	68	2	Sw. in water.
Herniaria glabra, L.	55	140	nil	

	Years old.	No. of Seeds.	Per cent. Germ.	
vulgaris, Spreng.	15	20	nil	A. de C.
Hesperis fragrans, Fisch.	50	20	nil	
Hibiscus brachysiphonius, F. v. M.	57	25	nil	
cannabinus, L.	59	120	nil	All sw. in water.
coccineus, Watt., var. speciosus.			some	Thuret. After 13 d. fl. on sea water.
diversifolius, Jacq.	41	75	nil	Sw. in water.
		12	nil	Sw. after 1¼ hr. in acid.
esculentus (Okra), L.	5	100*	50	Vilmorin. Ext. limit, 10 yrs.
ditto	10	40	20	
ditto	12		nil	Nobbe.
heterophyllus, Vent.	10	18	39	Sw. in water.
		72	39	Sw. after 1 hr. in acid.
Manihot, Linn.	fresh		nil	Berkeley. After 11 days in sea water.
militaris, Cav.	1	98*	92	Duvel. Buried; all died.
panduraeformis, Burm. f.	16	17	nil	Sw. in water.
		95	2	Sw. after 1 hr. in acid.
ditto	46	160	nil	All. sw. in water.
rhodopetalus, F. v. M.	25	13	nil	Sw. in water.
		32	nil	Sw. after 1hr. in acid.
spathulatus, Gaudich.	50	85	nil	
suranensis, L.	58	29	nil	All sw. in water.
syriacus, L.	29	33	nil	All sw. in water.
tiliaceus, L.			some	Lefroy. After months on sea water.
ditto	14	100	5	Sw. after 2 hr. in acid.
ditto	25	36	nil	All sw. in water.
Trionum, L.	16	31	nil	Sw. in water.
		18	12	Sw. after 1 hr. in acid.

	Years old.	No. of Seeds.	Per cent. Germ.	
ditto	51	40	5	After 5 m. soil, and warm water 1 week.
ditto	57	52	12	All sw. after 1 hr. in acid.
ditto	61	28	nil	Sw. in water.
ditto	61	78	8	After 2 hr. in acid.
ditto	70	90	1	Sw. in water of 119 seeds.
		3	nil	Sw. after 2 hr. in acid.
		8	25	Sw. after 4 hr. in acid.
		18	33	Sw. after 10 hr. in acid.
ditto	72	18	nil	Sw. in water.
		58	nil	Sw. after $\frac{3}{4}$ hr. in acid.
Hicksbeachia pinnatifolia, F. v. M.	15	16	nil	
Hieracium Auricula, L.	12	250	nil	
ditto	32?		few	Peter. Supp. age in ground.
gothicum, Fries.	55	110	nil	
Pilosella, L.	10	300	nil	
ditto	32?		few	Peter. Supp. age in ground.
tomentosum, All., var. verbascifolia, Pers.	50	110	nil	
umbellatum, L.	55	62	nil	
Hippomarathrum cristatum, Boiss.	57	40	nil	
Holcus lanatus, L.	fresh		39	Nobbe.
ditto	3		28	Nobbe.
ditto	18	250	nil	
ditto	45?		few	Peter. Supp. time buried.
ditto	54	150	nil	
mollis, L.	57	150	nil	

	Years old.	No. of Seeds.	Per cent. Germ.	
Holosteum umbellatum, Linn.	12	180	nil	
ditto	36 ?		few	Peter. Supp. time in soil.
Homalanthus Leschenaultianus, A. Juss.	57	15	nil	
Hordeum maritimum, With.	68	115	nil	
murinum, L.	57	100	nil	
vulgare, L., var. sativum (Barley)	fresh		many	D. After 28 days in sea water.
ditto			nil	D. After 42 days in sea water.
ditto	fresh	100	53	After 14 d. in ster. oxygenless water.
ditto	fresh	100	26	After 70 d. in ster. oxygenless water.
ditto	fresh	100	18	After 98 d. in ster. oxygenless water.
ditto	fresh	100	44	5 days in oxygenless water.
ditto	fresh	100	6	14 days in oxygenless water.
ditto	fresh	100	nil	21 days in oxygenless water.
ditto	fresh	100	nil	1 day in aqueous $HgCl_2$.
ditto	many		many	Salter. In mud under sea water.
ditto	fresh	100	nil	11 days in 50 per cent. alc.
ditto	fresh	100	45	14 days in abs. alc.
ditto	fresh	100	6	35 days in abs. alc.
ditto	fresh	100	nil	49 days in abs. alc.
ditto	fresh		some	Schroder. Des. to 2 per cent. water.
ditto	fresh	100	84	After 5 weeks in dry H. and N.
ditto	fresh	100	57	Des. 42 days at 37 deg. C.
ditto	fresh	100	72	1 day at 100 deg. C., dry.
ditto	¼	5	100	A. de C. Under Mercury.
ditto	2	10	20	Rom. Air dried.
ditto	2	10	40	Rom. In vacuo.

	Years old.	No. of Seeds.	Per cent. Germ.	
ditto	2	10	40	Rom. 1 yr. in H, O, N, or water vapour.
ditto	2	10	10	Rom. 1 yr. in CO.
ditto	2	10	30	Rom. 1 yr. in $CHCl_3$ vapour.
ditto	2	10	60	Rom. 1 yr. in ether vapour.
ditto	1	100*	98	Duvel. Buried, all died.
ditto	2		most	Rohde.
ditto	1	100	100	Burgerstein. Dry in air.
ditto	4	100	96	
ditto	7	100	95	
ditto	8 to 10	50	20	From Vict. Dept. of Agric.
ditto	10	100	95	
ditto	10	100	52	Haberlandt.
ditto	12		nil	Wiesner.
vulgare, Linn, var. nepalense.	15	20	nil	A. de C.
ditto	6	21	nil	
ditto	17	45	nil	
ditto	18	38	nil	
vulgare, Linn., var. nigrum.	14	20	nil	
Houstonia purpurea, Linn.	67	88	nil	
Hovea heterophylla, A. Cunn.	37	2	100	2 hr. in acid.
ditto	45	15	33	Sw. after 2 hr. in acid
linearis, R. Br.	54	25	24	2 hr. in acid.
ditto	105	12	17	Sw. after 3 hr. in acid
longifolia, R. Br.	12	60	6.6	3½ hr. in acid.
ditto	16	1	nil	Sw. in water.
		5	80	3 hr. in acid.

	Years old.	No. of Seeds.	Per cent. Germ.	
ditto	54	30	nil	All sw. in water. Unripe.
ditto	50	22	9	Sw. after 3 hr. in acid.
longifolia, R. Br., var. lanceolata.	16	16	56.2	3 hr. in acid.
Howittia trilocularis, F. v. M.	57	60	nil	
Huanaca hydrocotylea, F. v. M.	57	53	nil	
Humea cassinacea, F. v. M.	50	330	nil	
Humulus Lupulus. L. (Hop.).	50	140	nil	
ozothamnoides, F. v. M.	2	100*	50	Vilmorin. Ext. limit, 4 yrs.
Hydrocotyle asiatica, L.	57	65	nil	
asiatica, L., var. cordifolia, Hook.	54.	16	nil	
geranifolia, F. v. M.	57	72	nil	
hirta, R. Br.	57	100	nil	
laxiflora, de C.	37	45	nil	
vulgaris, L.	59	80	nil	
Hymenanthera Banksii, F. v. M.	57	50	nil	
Hymenosporum flavum, F. v. M.	10	60	nil	
Hyoscyamus Senecionis, Willd.	15	20	nil	A. de C.
Hypericum Androsaemum, L.	25	2000	nil	
ditto	35	1500	nil	
ditto	50	500	nil	
ditto	59	100	nil	
ditto	70	850	nil	
elatum, Ait.	15	20	nil	A. de C.
Elodes, Huds.	57	124	nil	
grandifolium, Choisy.	50	210	nil	
hirsutum, L.	26	500	nil	

	Years old.	No. of Seeds.	Per cent. Germ.		
ditto	50	1000	nil		
ditto	100?		few	Peter.	Supp. age in ground.
humifusum, L.	16	300	nil		
ditto	18	550	nil		
ditto	18?		many	Peter.	Supp. age in soil.
ditto	35?		few	Peter.	Supp. age in soil.
ditto	50	600	nil		
ditto	85	150	nil		
ditto	66	280	nil		
ditto	61	150	nil		
ditto	80	250	nil		
ditto	100?		few	Peter.	Supp. age in soil.
linearifolium, Vahl.	55	110	nil		
montanum, L.	55	140	nil		
perforatum, Linn.	12	5000	nil		
ditto	13	1200	nil		
ditto	15	20	nil	A. de C.	
ditto	20?		few	Peter.	Supp. age in soil.
ditto	36?		many	Peter.	Supp. age in soil.
ditto	45?		few	Peter.	Supp. time buried.
ditto	50	110	nil		
ditto	69	580	nil		
ditto	100?		some	Peter.	Supp. age in ground.
virginicum, Linn.	67	250	nil		
Hypocalymma robustum, Schau.	10	500	nil		
ditto	8	250	nil		

	Years old.	No. of Seeds.	Per cent. Germ.	
Hypochoeris radicata, Linn.	14	250	nil	
ditto	18?		few	Peter. Supp. age in soil.
ditto	23	140	nil	
Hyptis radiata, Willd.	15	20	nil	A. de C.
Hyssopus officinalis, Linn.	15	20	nil	A. de C.
officinalis, Linn. (Hyssop.).	3	100*	50	Vilmorin. Ext. limit, 5 yrs.
Iberis amara, var. Forestieri	50	27	nil	
pinnata, L., var, crenata.	15	20	nil	A. de C.
umbellata, L.	50	88	nil	
Ilex canadensis, Poir.	57	12	nil	
verticillata, Gray.	57	61	nil	
ditto	57	56	nil	
Impatiens Balsamina, Linn	15	20	5-15	A. de C.
ditto.	50	42	nil	
noli-me-tangere, Linn.	5	100	68	
ditto	50	34	nil	
Indigofera australis, Willd.	32	250	35.2	In acid 1 hr., all sw.
ditto	50	32	9	Sw. after 1 hr. in acid.
ditto	57	50	6	In acid 1 hr.
australis, Willd., var. Signata.	54	42	nil	Sw. in water.
australis, Willd, var. sylvatica.	50	54	nil	
		58	5.2	After 2 hr. in acid.
ditto	51	54	3.7	6 unswollen after 5 months. Germ. after 1 week in warm water at 40 deg. C.
cytisoides, L.	51	160	51.2	After 5 months in soil, 35 hard, unswollen. Of these 34 germ. on filing.

	Years old.	No. of Seeds.	Per cent Germ.	
ditto	81	40	5	Sw. after 2 hr. in acid.
tinctoria, Linn. (Indigo).	9	250	2	
ditto	6	500	3	
Inula crithmoides, L.	56	50	nil	
Helenium, L. (Elecampane).	5	100*	50	Vilmorin. Ext. limit, 6 yrs.
Iochroma tubulosa, Benth.	50	100	nil	
Ipomaea biloba, Forst., var. pes-caprae, Benth.	fresh		some	Moseley. 1 yr. in sea water.
eriocarpa, R. Br.	10	24	33.3	
grandiflora.	fresh		some	Guppy. After 1 yr. on sea water.
lacunosa, Linn.	1	98	88	Duvel. Buried deeply, 33 per cent.
purpurea, Rath.	50	29	nil	
Iris, sp.	18		some	Foster. Gard. Chron., 1907.
dichotoma, Pall.	15	20	nil	A. de C.
Pseudacorus, Linn.	1		some	Guppy. After 14 months in sea water.
Xiphium, Linn.	15	20	nil	A. de C.
Isachne australis, R. Br.	54	100	nil	
Isatis tinctoria, L.	59	68	nil	
Isopogon anethifolius, Knight	10	1000	nil	
ceratophyllus, R. Br.	47	33	nil	
Dawsoni, Maiden and Baker.	10	100	nil	
Isopyrum biternatum, Torr. and Gray.	67	53	nil	
fumarioides, L.	50	38	nil	
Isotoma axillaris, R. Br.	50	180	nil	
ditto	54	250	nil	
Ixia polystachya, Linn., var. erecta, Berg.	50	180	nil	

	Years old.	No. of Seeds.	Per cent Germ	
Ixiolaena tomentosa, Sond. and Muell.	57	320	nil	
Ixodia achilleoides, Ait., var. alata.	57	160	nil	
Jacksonia compressa, Turcz.	67	50	nil	Sw. in water.
Forrestii, F. v. M.	28	22	nil	Sw. in water.
hakeoides, Meissn.	30	60	nil	Sw. in water.
spinosa, R. Br.	72	27	3.7	After long soaking, and for weeks at 25 deg. C. appr.
thesioides, A. Cunn.	29	50	36	½ sw., none germ. Rest ½ hr. in acid. All sw. and 18 germ.
ditto	52	12	nil	Sw. after ½ hr. in acid.
vernicosa, F. v. M.	57	12	nil	
Jasione montana, L.	55	2000	nil	
Juncaceae.	25		nil	Becquerel.
Juncus acutus, L.	55	2000	nil	
balticus, Willd.	57	88	nil	
bufonius, L.	12	150	nil	
ditto	18?		many	Peter. Supp. age in soil.
ditto	22	280	nil	
ditto	35?		some	Peter. Supp. age in soil.
ditto	57	500	nil	
ditto	100?		many	Peter. Supp. age in soil.
ditto	2000?		some	Poisson. In soil.
ditto	30		nil	Becquerel.
caespiticius, E. Meyer.	55	1000	nil	
effusus, L., var. conglomeratus, L.	14	250	nil	
ditto	18?		few	Peter. Supp. age in soil.

	Years old.	No. of Seeds.	Per cent. Germ.		
ditto	35?		few	Peter.	Supp. age in soil.
ditto	50	200	nil		
ditto	100?		many	Peter.	Supp. age in soil.
effusus, L.	57	1000	nil		
falcatus, E. Meyer.	57	1000	nil		
filiformis, L.	50	500	nil		
ditto	100?		few	Peter.	Supp. age in soil.
glaucus, Sibth.	25	150	nil		
ditto	32?		few	Peter.	Supp. age in ground.
ditto	45?		many	Peter.	Supp. time buried.
ditto	50	250	nil		
ditto	100		many	Peter.	Supp. age in ground.
Holoschoenus, R. Br., var. humilis.	57	1000	nil		
maritimus, Lam.	54	1000	nil		
pallidus, R. Br., var. vaginatus.	57	1000	nil		
pauciflorus, R. Br.	57	500	nil		
planifolius, R. Br.	57	150	nil		
scirpoides, Lam.	57	140	nil		
Tenageia, Ehrb.	66	1000	nil		
ditto	105	250	nil		
ditto	58	5000	nil		
ditto	67	1000	nil		
ditto	48	500	nil		
ditto	many		some	Poisson.	In soil.
Juniperus communis, L.	59	48	nil		
ditto	55	88	nil		

	Years old.	No. of Seeds.	Per cent. Germ.	
Kalmia angustifolia, Linn.	50	100	nil	
angustifolia, Linn., var. Lucida Linn.	50	400	nil	
angustifolia, Linn., var. nitida.	50	350	nil	
angustifolia, Linn., var. serotina.	50	300	nil	
glauca, Ait.	50	250	nil	
latifolia, Linn.	50	200	nil	
latifolia, Linn., var. myrtifolia, Andr.	50	200	nil	
Kennedya Beckxiana, F. v. M.	8	11	nil	
monophylla, Vent.	16	12	50	2 hr. in acid.
ditto	50	25	15	2 hr. in acid.
prostrata, R. Br.	12	50	62	3 hr. in acid.
ditto	50	48	8	3 hr. in acid.
rubicunda, Vent.	7	28	71.4	2 hr. in acid.
ditto	12	100	28	2 hr. in acid.
ditto	57	2	nil	Sw. in water.
		20	70	2 hr. in acid.
ditto	65	18	10	After 2 hr. in acid.
ditto	50	12	nil	
Kibara macrophylla, Benth.	12	31	nil	
Kitaibelia vitifolia, Willd.	15	20	5-15	A. de C.
ditto	50	18	nil	
ditto	50	24	nil	
Kochia appressa, Benth.	20	50	nil	
brachyptera, F. v. M.	57	200	nil	

	Years old.	No. of Seeds.	Per cent. Germ.	
brevifolia, R. Br.	51	30	nil	
villosa, Lindl.	53	50	nil	
Krynitzkia, leiocarpa, Fisch. and Meyer.	50	64	nil	
leucophaea, A. Gray.	50	160	nil	
Kydia calycina, Roxb.	10	80	28.7	After 2 hr. in acid, all sw.
ditto	50	18	nil	Sw. after 2 hr. in acid.
Labichea lanceolata, Benth.	12	50	2	Large aril absorbs water, but not the seed.
ditto	50	48	nil	Cuticle frills off after filing, or is dissolved by 2 hr. in acid.
Laburnum anagyroides, Medic.	15	20	nil	A. de C.
Lactuca perennis, L.	3	100*	50	Vilmorin. Ext. limit, 5 yrs.
Scariola, Linn.	1	25	11.5	Duvel. Buried deeply, 69 per cent.
Scariola, Linn., var. sativa.	1	100*	98.5	Duvel. None germ. after 1 yr. buried.
Scariola, L., var. sativa (Lettuce).	5	100*	50	Vilmorin. Ext. limit, 9 yrs.
Scariola. Linn., var. sativa.	fresh	20	35	D. After 56 days in sea water.
	fresh	20	1	D. After 85 days in sea water.
Scariola, Linn., var. sativa (Lettuce Neapolitan).	10	250	nil	
Lagenaria vulgaris, Ser. (Bottle gourd).	6	100*	50	Vilmorin. Ext. limit, 10 yrs.
Lagenophora Huegelii, Benth.	57	105	nil	
Lagerstroemia lanceolata, Wall.	10	42	nil	
Lallemantia peltata, Fisch. and Meyer.	50	48	nil	
Lamium Galeobdolon, Crantz.	16	58	nil	
ditto	100?		few	Peter. Supp. ago in ground.
intermedium, Fries.	55	90	nil	

	Years old.	No. of Seeds.	Per cent. Germ.	
Lantana involucrata, Linn.	15	20	nil	A. de C.
mista, Linn., var. mixta, Hort.	50	11	nil	
Sellowiama, Link. and Otto.	6	16	nil	
Lodoicea sechellarum, Labill.				Trimen. Nut takes 10 yrs. to ripen, and seed 1 yr. to germinate.
Laportea crenulata, Gaudich.	40	55	nil	
Lapsana communis, Linn.	16	250	nil	
ditto	18?		few	Peter. Supp. age in soil.
Lasthenia glabrata, Lindl.	50	44	nil	
ditto			some	Berkeley. After 30 days in sea water.
Lathyrus Aphaca, L.	55	20	nil	All sw. in water.
articulatus, Linn.	50	56	nil	
articulatus, Linn., var. Cicera, All.	15	20	nil	A. de C.
hirsutus, L.	51	50	nil	
hirsutus, Linn., var. Cicer, Habl.	50	16	nil	
latifolius, Linn.	50	52	nil	
maritimus, Bigel.	34	44	nil	All sw. in water.
ditto	54	5	nil	Sw. in water.
		44	nil	Sw. after 1 hr. in acid.
ditto	50	17	nil	
Nissolia, Linn.	many		some	Poisson. In soil.
ditto	25	58	nil	
ditto	46	37	nil	All sw. in water.
Ochrus, D. C.	46	15	nil	All sw. in water.
odoratus, Linn.	50	12	nil	
palustris, L., var. graminifolius.	20	66	nil	Sw. in water.

	Years old.	No. of Seeds.	Per cent. Germ.	
sativus, L.	5	100	50	Vilmorin.
tingitanus, L.	50	72	nil	
Lavandula coronopifolia, Poir., var. multifida.	15	20	nil	A. de C.
vera, D. C.	5	100	50	Vilmorin. Ext. limit, 6 yrs.
Lavatera arborea, Linn.	15	20	5-15	A. de C.
ditto	55	100	nil	All sw. in water.
ditto	59	84	nil	Sw. in water.
ditto	50	42	nil	
cretica, Linn.	15	20	30	A. de C.
ditto	50	46	nil	
Julii, Burch.	74	40	nil	All sw. in water.
olbia, L.	63		some	Becquerel.
plebeia, Sims.	13	170	28.2	1½ hr. in acid.
ditto	18	100	7	1½ hr. in acid.
ditto	50	68	nil	Sw. after 1 hr. in acid.
ditto	54	50	nil	28 sw. in water, rest after 1 hr. in acid.
Leycesteria formosa, Wall.	50	24	nil	
Lemna minor, Linn.			nil	Guppy. After a few days in sea water.
Lens esculenta, Moench.	4	100*	50	Vilmorin. Ext. limit, 9 yrs.
ditto.	64		some	Becquerel.
esculenta, Moench., var majus.	50	41	nil	
esculenta, Moench., var. minus.	50	26	nil	
Leonurus Cardiaca, L	15	1000	nil	
ditto	50	108	nil	
Leontodon hispidus, L.	14	200	nil	

	Years old.	No. of Seeds.	Per cent. Germ.	
ditto	36?		few	Peter Supp. time in soil.
ditto	38	55	nil	
Lepidium campestre, Ait.	12		nil	Nobbe.
ditto	17	210	nil	
ditto	50	24	nil	
ditto	61	41	nil	
ditto	300		nil	Nobbe. Old Herb.
draba, Linn.	50	64	nil	
ditto	62	45	nil	
hirtum, Sm., var. Smithii.	50	120	nil	
ditto.	61	90	nil	
leptopetalum, F. v. M.	47	38	nil	
monoploeoides, F. v. M.	57	200	nil	
papillosum, F. v. M.	57	110	nil	
perfoliatum, L.	50	210	nil	
ruderale, L.	41	200	nil	
ruderale, Linn., var. hyssopifolium.	57	82	nil	
ditto	58	100	nil	
ditto	64	116	nil	
sativum, L. (Cress).	fresh	57	10	D. After 56 days in sea water.
ditto			2	D. After 85 days in sea water.
ditto	fresh	60	6	D. After 65 days in cold sea water.
ditto	fresh	100	51	3 weeks in abs. alc.
ditto	fresh	100	30	4 weeks in abs. alc.
ditto	fresh	100	nil	5 weeks in abs. alc.
ditto	fresh	100	nil	5 days in 50 per cent. alc.

	Years old.	No. of Seeds.	Per cent. Germ.	
ditto	2	10	90	Rom. Air dried.
ditto	2	10	80	Rom. 15 m. in vacuo, or 1 yr. in H_2S
ditto	2	10	100	Rom. 1 yr. in O H or N.
ditto	2	10	40-60	Rom. 1 yr. in CO, ether or chloroform vapour.
ditto	2	10	nil	Rom. 1 yr. in aqueous vapour.
ditto	5	100	50	Vilmorin. Ext. limit, 9 yrs.
ditto	10	250	nil	
ditto	51	60	nil	
Lepilaena australis, Drum.	57	75	nil	
Leptocarpus Brownii, Hook. f., var. simplex, R. Br.	57	80	nil	
ditto	57	200	nil	
Leptorrhynchos squamatus, Less.	57	250	nil	
tenuifolius, F. v. M.	57	180	nil	
Waitzia, Sond.	57	182	nil	
Leptospermum flavescens, Sm.	15	1000	nil	
ditto	50	40	nil	
laevigatum, F. v. M.	50	84	nil	
myrtifolium, Sieb.	57	200	nil	
pubescens, Lam., var. grandifolium.	54	2000	nil	
ditto	57	100	nil	
pubescens, Lam., var. lanigerum.	50	280	nil	
ditto	54	500	nil	
rupestre, Hook. f.	57	1000	nil	

	Years old.	No. of Seeds.	Per cent. Germ.	
scoparium, Forst.	10	1000	8.2	2 months to completo germ.
ditto	16	500	2.4	3 months to complete germ.
ditto	57	1000	nil	
scoparium, Forst. (juniperinum).	50	45	nil	
ditto	55	500	nil	
Lespedeza capitata, Michx., var. frutescens.	1	15	1	Duvel. Buried in soil, 1 per cent.
violacea, Pers.	47	82	nil	All sw. in water.
ditto	67	110	nil	All sw. in water.
Leucaena glauca, Benth.	15	42	nil	All sw. in water.
ditto	42	24	nil	All sw. in water.
ditto	60	100	nil	All sw. in water.
leucocephala ?	70		some	Becquerel. Name not in Kew Index.
pulverulenta, Benth.	18	7	29	Sw. in water.
ditto		12	42	Sw. after 1¼ hr. in acid.
Leucanthemum lacustre, Brot.	50	80	nil	
Leucas martinicensis, R. Br.	15	20	nil	A. de C.
Leucopogon acuminatus, R. Br.	57	30	nil	
Hookeri, Sond.	57	32	nil	
Hookeri, Sond., var. obtusatus.	57	60	nil	
Hookeri, Sond., var. vallinus.	57	22	nil	
insularis, A. Cunn.	57	24	nil	
juniperinus, R. Br.	47	152	nil	
lanceolatus, R. Br.	44	50	nil	
ditto, var. affinis.	57	250	nil	
Maccraei, F. v. M.	54	25	nil	

	Years old.	No. of Seeds.	Per cent. Germ.	
Richei, R. Br.	57	20	nil	
Levisticum officinale, Koch. (Lovage).	3	100*	50	Vilmorin. Ext. limit, 4 yrs.
Ligusticum apioides, Phil.	15	20	nil	A. de C.
Ligustrum vulgare, Linn.	50	17	nil	
Liliaceæ.	25		nil	Becquerel.
Lilium tigrinum, Ker. Gawl.	50	80	nil	
Limnanthes Douglasii, R. Br.			some	Berkeley. After 30 days in sea water.
Limosella aquatica, L.	30	58	nil	
ditto	50	500	nil	
ditto, var. tenuifolia, Wolf.	57	220	nil	
Linaria Elatine, Mill.	18	120	nil	
ditto	22?		few	Peter. Supp. age in soil.
ditto	59	100	nil	
ditto	61	42	nil	
ditto	71	72	nil	
viscida, Moench.	61	84	nil	
vulgaris, Mill.	16	250	nil	
ditto	20?		few	Peter. Supp. time in soil.
ditto	25	94	nil	
Linum alpinum, L., var. Leonii, Schultz.	49	80	nil	
angustifolium, Huds.	23	190	nil	
ditto	50	160	nil	
ditto	57	93	nil	
austriacum, L.	54	30	nil	
catharticum, Linn.	24	47	nil	
ditto	32?		some	Peter. Supp. age in ground.

	Years old.	No. of Seeds.	Per cent. Germ.	
ditto	45?		few	Peter. Supp. time buried.
ditto	46?		few	Peter. Supp. time buried.
ditto	59	72	nil	
ditto	100?		few	Peter. Supp. age in soil.
grandiflorum, Desf.	50	24	nil	
maritimum, Linn.			some	Mart. After 45 days on sea water.
mexicanum, H. B. and K.	15	180	nil	
perenne, L.	49	150	nil	
ditto	50	84	nil	
strictum, Linn., var. alternum.	83	30	nil	
usitatissimum, L. (Linseed).			few	D. After 14 days in sea water.
ditto			1	D. After 28 days in sea water.
ditto			nil	D. After 42 days in sea water.
ditto	fresh	100	60	5 days oxygenless water.
ditto	fresh	100	36	14 days oxygenless water.
ditto	fresh	100	nil	21 days oxygenless water.
ditto	fresh	100	nil	1 day aqueous $HgCl_2$.
ditto	fresh	100	72	After 5 weeks in dry H and N.
ditto	fresh	100	20	After 14 days in abs. alc.
ditto	fresh	100	1	After 28 days in abs. alc.
ditto	fresh	100	nil	After 35 days in abs. alc.
ditto	fresh	100	nil	After 1 day in 50 per cent. alc.
ditto	1	93	83	Duvel. None germ. after 1 yr. in soil.
ditto	fresh		46-98	Nobbe.
ditto	4		10-78	Nobbe.
ditto	12		14	Nobbe.

	Years old.	No. of Seeds.	Per cent. Germ.	
ditto	12		nil	
ditto	15	20	nil	A. de C.
ditto	50	52	nil	
ditto	55	84	nil	
Lippia rubiginosa, Schau.	15	20	nil	A. de C.
Lithospermum officinale, Linn.	15	20	nil	A. de C.
Livistona australis, Mart.	8	4	nil	
Lobelia Erinus, Linn.			very	A. de C. Cooled 100 t. to about 50 deg.
ditto	fresh		few	
gibbosa, Labill.	50	186	nil	
ditto, var. simplicicaulis.	50	2000	nil	
	55	150	nil	
heterophylla, Labill.	50	200	nil	
Lobostemon fruticosus, Buek.	50	41	nil	
Logania crassifolia, R. Br.	57	50	nil	
floribunda, R. Br.	10	100	nil	
ovata, R. Br.	57	100	nil	
Loiseleuria procumbens, Desf.	61	130	nil	
Lolium perenne, L.	55	90	nil	
perenne, L., var. tenue, L.	15	20	nil	A. de C.
temulentum, L.	15	20	nil	A. de C.
ditto	55	46	nil	
Lomatia silaifolia, R. Br.	12	80	nil	
Lonas inodora, Gaertn.	50	240	nil	
Lonicera Caprifolium, L., var. proliferum.	50	13	nil	
sempervirens, Linn.	50	14	nil	

	Years old.	No. of Seeds.	Per cent. Germ.	
Quinquelocularis, Hardw.	50	23	nil	
Loranthus Quandong, Lindl., var. canus.	54	20	nil	
Lotus biflorus, Desr.	50	15	nil	
ditto	50	38	nil	
corniculatus, L.	18	140	22	After ¼ hr. in acid.
ditto	50	38	nil	
ditto	57	10	nil	
ditto	100?		few	Peter. Supp. age in soil.
edulis, L.	68	22	nil	
Jacobaeus, Linn.	15	20	nil	A. de C.
Tetragonolobus, L. (Winged Pea).	5	100*	50	Vilmorin. Ext. limit, 9 yrs.
ditto	13	10	20	Embryos sw. slowly within endosperm.
ditto	16	50	4	
ditto	50	23	nil	
ditto	15	13	nil	
Loudonia Behrii, Schl.	57	100	nil	
Lunaria annua, L., var. biennis.	15	20	nil	
rediviva, L.	50	30	nil	
Lupinus albus, L.	fresh	100	94	
ditto	fresh	100	92	Des. 28 days to 1.88 per cent. water.
elegans, H. B. and K., var. moritzianus, Kunth.	50	10	nil	Des. 56 days to 1.28 per cent. water.
hirsutus, L.	50	6	nil	
luteus, L.	fresh	12	33	D. After 22 days in sea water.
ditto		18	17	D. After 36 days in sea water.
ditto			nil	D. After 50 days in sea water.

	Years old.	No. of Seeds.	Per cent. Germ.	
ditto	50	40	nil	
nanus, Dougl.	50	51	nil	
nanus, Dougl., var. bicolor.	50	8	nil	
polyphyllus, Lindl.	fresh	14	21	D. After 22 days in sea water.
ditto			nil	D. After 36 days in sea water.
ditto	50	18	nil	
pubescens, Benth.			few	Berkeley. After 30 days in sea water.
ditto	50	8	nil	
Termis, Forsk.	12		nil	Nobbe.
versicolor, Sweet.	50	13	nil	
Luzula campestris, D. C.	16	200	nil	
ditto	27	500	nil	
ditto	32?		few	Peter. Supp. age in soil.
ditto	35?		few	Peter. Supp. age in soil.
ditto	36?		some	Peter. Supp. age in soil.
ditto	45?		some	Peter. Supp. age in soil.
ditto	100?		few	Peter. Supp. age in soil.
Forsteri, D. C.	60	31	nil	
Forsteri, D. C., var. pilosa.	22	137	nil	
ditto	32?		few	Peter. Supp. age in ground.
ditto	100?		few	Peter. Supp. age in soil.
Lychnis Flos-cuculi, Linn.	50	58	nil	
Githago, Scop.	15	20	nil	A de C.
ditto	1	99*	98.5	Duvel. None germ. after 1 yr. in soil.
grandiflora, Jacq., var. coronata.	50	140	nil	
viscaria, Linn.	50	210	nil	

	Years old.	No. of Seeds.	Per cent. Germ.	
Lycium barbarum, L.	50	12	nil	
Lycopersicum esculentum, Mill. (Tomato)	12		20	Nobbe.
ditto			some	Thuret. After 13 m. fl. on sea water.
ditto	4	100*	50	Vilmorin. Ext. limit 10 yrs.
ditto			few	D. After 22 day in sea water.
ditto			nil	D. After 36 days in sea water.
ditto	1	99*	72.5	Duvel. Buried in soil, 1 per cent.
Lycopsis arvensis, L., var. pusillus.	53	131	nil	
Lysimachia atropurpurea, L.	10		some	Meehan. Supp. age in soil.
quadrifolia, L.	57	52	nil	
vulgaris, Linn.	many		some	Salter. In mud under sea water.
ditto	15	20	nil	A. de C.
Lythrum Salicaria, L.	57	550	nil	
Macadamia ternifolia, F. v. M.	15	18	nil	
Madia elegans, D. Don	50	22	nil	
sativa, Molina.	15	20	nil	A. de C.
Maianthemum Convallaria, Wigg.	57	16	nil	
Malcolmia maritima, Ait.	15	20	nil	A. de C.
ditto	41	1000	nil	
Mallotus philippinensis, Muell. Arg.	13	60	nil	
Malope trifida, Cav., var. grandiflora.	fresh		some	Berkeley. After 30 days in sea water.
Malva crispa, L. (Curled-leaved Mallow).	5	100*	50	Vilmorin. Ext. limit, 8 yrs.
ditto	52	78	nil	
rotundifolia, L.	10	100	72	All sw. after 3 hr. in acid.
ditto	17	100	8	All sw. after 3 hr. in acid.
ditto	57	30	nil	

	Years old.	No. of Seeds.	Per cent. Germ.	
sylvestris, L.	42	156	nil	All sw. in water.
ditto	59	120	nil	All sw. in water.
sylvestris, L., var. vulgaris, Gray.	300		nil	Nobbe. Old Herb.
Malvastrum limense, Ball.	15	20	nil	A. de C.
ditto	50	63	nil	
vitifolium, Hemsl.	15	20	5-15	A. de C.
Marianthus procumbens, Benth.	57	60	nil	
Marrubium astracanicum, Jacq.	15	20	nil	A. de C.
vulgare, L. (Horehound).	3	100*	50	Vilmorin. Ext. limit, 6 yrs.
Marsdenia rostrata, R. Br.	52	40	nil	
Martynia proboscidea, Glox.	1 or 2	100*	50	Vilmorin.
Matthiola incana, R. Br.	16	100	nil	
ditto	15	20	nil	A. de C.
incana, R. Br., var. annua, Sweet.	15	20	nil	A. de C.
ditto			some	D. After 28 days in sea water.
ditto			nil	D. After 54 days in sea water.
Matricaria inodora, Linn.	12	250	nil	
ditto	18?		few	Peter. Supp. age in soil.
Maurandia Barclaiana, Lindl.	50	88	nil	
Medicago arborea, L.	50	42	nil	
denticulata, Willd.	15	20	5-15	A. de C.
ditto	17	100	4	1½ hr. in acid.
ditto	51	80	nil	
ditto	57	32	nil	All sw. in water. Unripe.
lupulina, Linn.	22?		few	Peter. Supp. age in soil.
ditto	50	82	nil	All sw. in water.

	Years old.	No. of Seeds.	Per cent Germ.	
ditto	50	12	67	Sw. after 1 hr. in acid.
ditto	1400?		nil	Des Moulins. Seed from a Roman tomb.
sativa, L. (Lucerne).			some	Thuret. After 13 months floating on sea water.
ditto	1	84*	64	Duvel. Buried in soil, 9 per cent.
‡ditto	3		50	Giglioli. In air.
ditto	3		63	Giglioli. In dry H.
ditto	3		24	Giglioli. In dry CO_2.
ditto	2		0.5	Giglioli. In NH_3.
ditto	2		4.5	Giglioli. In dry SO_2.
ditto	2		nil	Giglioli. In 60 deg. eth. alc.
ditto	2		23	Giglioli. In 80 deg. eth. alc.
ditto	2		78	Giglioli. In 100 deg. eth. alc.
ditto	3		1.3	Giglioli. In ether.
ditto	3		nil	Giglioli. In chloroform.
ditto	1		1.5	Giglioli. In alc. iodine.
ditto	16	255	70.98	Giglioli. In AsH_3.
ditto	16	247	68.8	Giglioli. In AsH_3
ditto	16	266	84.2	Giglioli. In CO.
ditto	16	629	0.79	Giglioli. In N_2O_2.
ditto	16		nil	Giglioli. In chloroform.
ditto	16	60	66	Giglioli. In abs. alcohol.
ditto	16	79	20.2	Giglioli. In alc. $HgCl_2$.
ditto	16		nil	Giglioli. In alc. phenol. (not dry).
ditto	16	51	nil	Giglioli. In hydrogen.

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‡ If the seeds were at all moist, all were rapidly destroyed in Giglioli's tests.

	Years old.	No. of Seeds.	Per cent. Germ.	
ditto	16	293	0.68	Giglioli. In oxygen.
ditto	16	320	56	Giglioli. In nitrogen.
ditto	16	342	6.7	Giglioli. In Cl. and HCl.
ditto	16	167	5.9	Giglioli. In Cl. and HCl.
ditto	16	101	0.99	Giglioli. In H_2S.
ditto	11		54	Samek.§
ditto	20	40	nil	All sw. in water.
ditto	50	48	nil	All sw. in water.
ditto	50	10	20	Sw. after 1 hr. in acid.
sativa, Linn., var. media, Pers.	12		12	Nobbe.
scutellata, Mill.	5	100*	50	Vilmorin. Ext. limit 9 yrs.
ditto	7	80	95	70 hard after 1 week soaking. Filed, sw., and 66 germ. in 3 days.
ditto	15	14	43	8 sw. and rotted; 6 unswollen after 3 weeks' soaking, all of which sw. and germ. after sand-papering.
ditto	16	32	3.1	Sw. in water.
		25	8	In acid 2 hr.
ditto	37	100	2	
ditto	70	6	nil	
sphaerocarpa, Bertol.	72	65	nil	10 sw. only after 20 minutes in acid.
truncatula, Gaertn. (Sorrentini).	48	66	nil	
truncatula, Gaertn., var. tribuloides, Desr.	54	16	nil	Sw. in water.
		30	3.3	In acid 2 hr.
Meionectes Brownii, Hook. f.	57	100	nil	

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§ Tirol. Landw. Bl., 1894, 13, 161.

	Years old.	No. of Seeds.	Per cent. Germ.	
Melaleuca ericifolia, Sm.	37	250	nil	
ditto ,	37	150	nil	
linariifolia, Sm.	18	1600	nil	
thymifolia, Sm.	50	2000	nil	
Melampyrum sylvaticum, L.	56	200	nil	
Melanthera deltoidea, Michx.	15	20	nil	A. de C.
hastata, Michx.	50	21	nil	
Melastoma malabathricum, L.	57	350	nil	
Melia Azedarach, Linn.	12	24	nil	
Melianthus major, Linn.	59	21	nil	
minor, Linn.	50	22	nil	
Melica nutans, Linn.	14	80	nil	
ditto	18	27	nil	
ditto	20?		few	Peter. Supp. time in soil.
ditto	55	40	nil	
Melilotus alba, Desr.	44	250	52	24 per cent. germ. after 3 weeks' soaking, $\frac{1}{3}$ still hard. Sand-papered, soaked, and 28 per cent. germ. in 1 week.
ditto	47	1000	67.4	30 germ. in soil, 706 remained hard until sand-papered and soaked at 20-25 deg. C.
ditto	60	1000	22.4	9.2 per cent. sw. and germ. in 2-3 days.
ditto	77	1000	18.2	
alba, Desr., var. altissima, Wall.	38	2000	25.5	5 per cent. germ. after 3 weeks' soaking; over $\frac{1}{2}$ still hard. Sand-papered, sw., and 20.5 per cent. germ. in one week.
ditto	12		nil	Nobbe.

	Years old.	No. of Seeds.	Per cent. Germ.	
Melilotus bicolor, Boiss and Bal.	50	50	nil	
Bonplandi, Tenore.	40	1000	9.8	4 per cent. soaking and 5.8 per cent. or hard seed after scratching and soaking.
gracilis, D. C.	40	1000	36.4	12 germ. in soil. Rest (404) hard after 1 month in soil and 1 week water at 20-25 deg. C. Then sand-papered and swelled.
ditto	50	1000	70.3	24 germ. on soaking, after 1 month in soil; 694 still hard, of which 97 per cent. germ. after sand-papering.
ditto	51	48	16.6	Germ. after prolonged soaking.
ditto	58	1000	28.8	
ditto	82	410	nil	Sw. in water.
ditto		590	22.5	After 1 hr. in acid.
italica, Lam.	47	100	nil	
messanensis, All.	15	20	nil	A. de C.
ditto	45	100	1	All sw. without filing.
officinalis, Lam.	15	20	nil	A. de C.
ditto	15	20	nil	A. de C.
ditto	54		some	Becquerel.
officinalis, Lam., var. arvensis.	57	88	nil	All sw. in water.
officinalis, Lam., var. Kochiana.	76	50	nil	
parviflora, Desf.	41	500	16.6.	Began to germ after 2 days. Nearly all sw. without scratching.
ditto	40	1000	4.2	
ditto	51	1000	6.5	3 germ. in soil after 1 month. 64 hard seed germ. after sand-papering.

	Years old.	No. of Seeds.	Per cent. Germ.	
ditto	50	1000	16.7	1 germ. in soil, rest taken up after 1 m. filed, soaked, and 83 per cent. of remainder (210) germ. at 20-22 deg. C.
ditto	55	40	nil	All sw. in water.
sulcata, Desf.	20	300	nil	
sulcata, Desf. (Pisa Bot. Gard.)	72	80	nil	
ditto	78	100	nil	
Melissa officinalis (Meliss-balm), L.	4	100*	50	Vilmorin. Ext. limit, 7 yrs.
ditto	10	250	nil	
ditto	55	82	nil	
Melothria Muelleri, Benth.	57	29	nil	
Mentha arvensis, L.	19	120	nil	
ditto	25	245	nil	
ditto	45 !		few	Peter. Supp. time buried.
laxiflora, Benth.	54	100	nil	
Pulegium, L.	50	110	nil	
Mercurialis annua, Linn.	1400 ?		some	Des Moulin. Seed from a Roman tomb.
ditto	18	110	nil	
Mesembryanthemum.			some	Thuret. After 13 m. floating on sea water.
aequilaterale, Haw., var. praecox.	57	100	nil	
australe, Soland.	57	100	nil	
crystallinum, L. (Ice Plant).	5	100*	50	Vilmorin.
pomeridianum, Linn.	50	50	nil	
pugioniforme, Linn.	50	180	nil	
Mezoneurum brachycarpum.	15	1	nil	
Scortechinii, F. v. M.	10	15	nil	

	Years old.	No. of Seeds.	Per cent. Germ.	
Micranthus alopecuroideus, Eckl.	50	22	nil	
Microglossa albescens, C.B. Clarke.	50	80	nil	
Microtis media, R. Br.	55	1000	nil	
porrifolia, R. Br.	37	100	nil	
Milium multiflorum, Cav.	48	100	nil	
Millettia megasperma, Benth.	28	6	nil	
Millotia australis, Benth.	15	6	nil	
caffra, Meiss.	9	8	nil	
tenuifolia, Cass.	55	130	nil	
Mimosa, sp.	67	108	3	Sw. after 1 hr. in acid. Seedlings eaten.
asperata, Linn.	26	62	36	Sw. only after 1 hr. in acid.
biuncifera, Benth.	21	110	nil	All sw. in water.
distachya, Cav.	52		some	Becquerel.
glomerata, Forsk.	52		some	Becquerel.
pudica, L.	fresh		few	de C. Cooled 100 t. to about 50 deg. C.
ditto	60		some	A. P. de Candolle.
sensitiva, L.	fresh		many	D. After 36 days in sea water.
ditto	fresh		many	D. After 50 days in sea water.
tequilana, Wats.	14	80	nil	All sw. in water.
Mimulus gracilis, R. Br.	57	100	nil	
Minuria leptophylla, D. C., var. asteroidea.	47	100	nil	
Mirabilis Jalapa, Linn.	50	10	nil	
Mirbelia oxyloboides, F. v. M.	10	50	38	1½ hr. in acid.
ditto	16	25	12	1½ hr. in acid.
reticulata, Sm.	10	20	75	In acid 3 hr.

	Years old.	No. of Seeds.	Per cent. Germ.	
ditto	26	50	12	In acid 3 hr.
ditto	47	100	3	In acid 3 hr.
ditto	12	37	nil	Sw. in water.
		10	nil	After 1 hr. in acid.
		17	18	After 3 hr. in acid.
Mitrasacme polymorpha, R. Br.	57	40	nil	
pilosa, Labill., var. Stuartii.	57	30	nil	
Modiola multifida, Moench.	50	82	nil	
ditto	15	20	5-15	A. de C.
ditto, var. caroliniana.	50	77	3	
ditto	59	40	nil	
Mollugo oppositifolia, L., var. novo-hollandica.	57	1000	nil	
verticillata, L.	67	300	nil	
Monotoca elliptica, R. Br.	57	50	nil	
Montia fontana, L.	57	63	nil	
Moraea iridioides, Linn.	50	23	nil	
Morgania glabra, R. Br. (B. floribunda).	57	120	nil	
Morina longifolia, Wall.	50	14	nil	
Morinda jasminoides, A. Cunn.	57	14	nil	
Mucuna gigantea, D. C.	11	5	60	8 hr. in acid.
ditto	drift	5	20	Guppy. After 1 yr. in sea water.
pruriens, D. C., var. utilis, Wall.	40	12	nil	
urens, Medic.	5	5	20	Guppy. After 1 yr. in sea water.
ditto	10	3	nil	Sw. after filing.
Muehlenbeckia polygonoides, F. v. M.	57	23	nil	

	Years old.	No. of Seeds.	Per cent. Germ.	
Myoporum acuminatum, R. Br., var. Cunninghamii, Benth.	50	22	nil	
ditto	57	16	nil	
debile, R. Br., var. diffusum, R. Br.	57	20	nil	
deserti, A. Cunn., var. dulce.	54	20	nil	Filed.
parvifolium, R. Br., var. humile.	37	19	nil	
parvifolium, R. Br.	57	100	nil	
serratum, R Br., var. insulare.	50	51	nil	
ditto	57	37	nil	
Myosotis stricta, Link., var. hispida.	17	88	nil	
ditto	18	125	nil	
ditto	20?		few	Peter. Supp. time buried.
ditto	18?		few	Peter. Supp. age in soil.
ditto	20	170	nil	
Myosurus minimus, L.	57	250	nil	
Myrcia variabilis, D. C.	15	62	nil	
Myrica cerifera, L.	50	30	nil	
Gale, L.	60	200	nil	
Myriogyne orbicularis, Lour.	54	1000	nil	
Myriophyllum spicatum, L.	61	48	nil	
Myrrhis odorata, Scop. (Sweet-scented chervil).	1	100	50	Vilmorin.
Myrsine variabilis, R. Br.	47	30	nil	
ditto	55	34	nil	
Nasturtium indicum, D C.	15	20	nil	A. de C.
officinale, R. Br. (Water-cress).	5	100*	50	Vilmorin. Ext. limit, 9 yrs.

	Years old.	No. of Seeds.	Per cent. Germ.	
officinale, R. Br.	18	100	nil	
palustre, D. C.	10	150	nil	
ditto	45?		few	Peter. Supp. time buried.
ditto	67	1000	nil	
sylvestre, R. Br.	300		nil	Nobbe. Old Herb.
trifolium, Rchl.	57	250	nil	
Nelumbium luteum, Willd.	55	6	83	Poisson. Air dried.
ditto	55		some	Becquerel.
ditto	57		some	Becquerel.
speciosum, Willd.			some	Mart. After 45 d. floating on sea water.
ditto	17		some	Becquerel.
Nemophila insignis, Benth.			nil	Berkeley. After 30 days in sea water.
parviflora, Dougl.	50	64	nil	
maculata, Benth.			nil	Berkeley. After 30 days in sea water.
Menziesii, Hook. and Arn., var. atomaria.			nil	Berkeley. After 30 days in sea water.
Menziesii, var. discoidalis, Lam.			nil	Berkeley. After 30 days in sea water.
Nepeta botryoides, Ait.	15	20	5-15	A. de C.
Cataria, Linn.	15	3000	3.5	After prolonged soaking.
Nephelium leiocarpum, F. v. M.	57	25	nil	
semicinereum, F. v. M., var. semiglaucum.	57	40	nil	
tomentosum, F. v. M.	57	25	nil	
Nertera reptans, F. v. M.	57	53	nil	
ditto	57	25	nil	
Neslia paniculata, Desv.	1	96	97	Duvel. Buried deeply. 38.5 per cent.
ditto	15	20	nil	A. de C.

	Years old.	No. of Seeds.	Per cent. Germ.	
Newcastlia spodiotricha, F. v. M.	27	200	nil	
Nicotiana glauca, R. Gratz.	50	150	nil	
glutinosa, Linn.	15	20	nil	A. de C.
rustica, Linn.	50	57	nil	
rustica, Linn., var. asiatica.	15	20	nil	A. de C.
suaveolens, Lehm.	50	200	nil	
Tabacum, L.	1	89	84	Duvel. Buried deeply, 70 per cent.
ditto	30		nil	Becquerel.
ditto	50	1350	nil	
Tabacum, L., var. angustifolia.	50	220	nil	
virginica, Agardh.	10	1000	nil	
Nigella damascena, Linn.	fresh		nil	Kinzel.
ditto	15	20	nil	A. de C.
ditto	50	39	nil	
orientalis, L.	50	14	nil	
sativa, L. (Black cumin).	fresh		nil	Kinzel. Exposed to light at 20 deg. C.
ditto			94	Kinzel. In darkness at 20 deg. C.
ditto	3	100*	50	Vilmorin. Ext. limit, 6 yrs.
Nipa fruticans, Thunb.			some	Chamisso. 1 yr. floating on sea water.
Nolana atriplicifolia, Don	50	32	nil	
ditto, var. grandiflora.			some	Berkeley. After 30 days in sea water.
paradoxa, Lindl.	50	15	nil	
Noltea africana, Reichb.	50	20	nil	
Notelaea ligustrina, Vent.	47	3	nil	
longifolia, Vent.	10	20	nil	
ditto	47	12	nil	

	Years old.	No. of Seeds.	Per cent Germ.	
longifolia, Vent., var. venosa.	57	16	nil	
Nothoscordum fragrans, Kunth.	50	88	nil	
ditto	15	20	nil	A. de C.
Notospartium Carmicheliae, Hook. f.	17	41	nil	Sw. after 1 hr. in acid.
Nymphaea gigantea, Hook.	12	100	22	After 3 days' soaking in warm water.
ditto	16	50	6	After 3 days' soaking in warm water.
Ochrosia Poweri, Bailey.	11	20	5	Endosperm of 2 others showed signs of life, but not the embryo.
Ocimum Basilicum, L. (Sweet Basil).	8	100*	50	Vilmorin. Ext. limit, 10 yrs.
Basilicum, L.	15	20	nil	A. de C.
Basilicum, L., var. maximum.	15	20	nil	A. de C.
Basilicum, L., var. minimum, L.	8	100*	50	Vilmorin. Ext. limit, 10 yrs.
Basilicum, L., var. nigrum, L.	15	20	nil	A. de C.
gratissimum, L. (Tree-basil).	8	100*	50	Vilmorin. Ext. limit, 10 yrs.
sanctum, L.	15	20	nil	A. de C.
Oenanthe Phellandrium, Lam.	15	20	nil	A. de C.
ditto	58	145	nil	
Oenothera acaulis, Cav.	41	250	nil	
acaulis, Cav., var. taraxacifolia.	50	65	nil	
amoena, Lehm.			nil	Berkeley. After 30 days in sea water.
ditto			some	Berkeley. After 30 days in sea water.
biennis, L. (Evening primrose).	1		nil	Duvel. If buried, died.
ditto	15	20	nil	A. de C.
ditto	3	100*	50	Vilmorin. Ext. limit, 5 yr.
ditto	27	38	nil	
ditto	50	180	nil	

	Years old.	No. of Seeds.	Per cent. Germ.	
biennis, L., var. grandiflora, Ait.	50	1480	nil	
purpurea, Curt.	50	54	nil	
sinuata, L.	15	20	nil	A. de C.
tetraptera, Cav.	50	210	nil	
tetraptera, Cav., var. mutabilis.	15	20	nil	A. de C.
Olea paniculata, R. Br.	10	35	nil	
verrucosa, Link.	50	13	nil	
Olearia argophylla, F. v. M.	22	100	nil	
ditto	50	124	nil	
glandulosa, Benth.	54	150	nil	
glutinosa, Benth.	54	500	nil	
myrsinoides, F. v. M.	15	250	nil	
pimeleoides, Benth.	14	210	nil	
ditto	57	250	nil	
ramulosa, Benth.	18	100	nil	
ditto	50	60	nil	
stellulata, D. C.	12	100	nil	
stellulata, D. C., var. fulvida, D. C.	50	128	nil	
stellulata, D. C., var. Gunniana, Hook. f.	50	28	nil	
stellulata, var. lyrata, D. C.	50	90	nil	
viscosa, Benth.	12	120	nil	
ditto	57	130	nil	
Omphacomeria acerba, A. de C.	57	15	nil	
Onagraceæ.	25		nil	Becquerel.
Onobrychis Crista-galli, Lam.	5	100*	50	Vilmorin. Ext. limit, 7 yrs.

	Years old.	No. of Seeds.	Per cent. Germ.	
viciaefolia, Scop., var. sativa, Lam.	12		nil	Nobbe.
Natrix, Linn.	15	20	nil	A. de C.
Ononis hispida, Desf.	50	49	nil	
porrigens, Salzm., var. foetida.	50	22	nil	
Onopordon Acanthium, L.	1	95*	31	Duvel. Buried deeply, 93 per cent.
ditto	47	27	nil	
illyricum, Linn.	15	20	nil	A. de C.
tauricum, Willd.	15	20	nil	A. de C.
Opercularia scabrida, Schl.	57	100	nil	
Ophrys apifera, Huds.	55	1500	nil	
Oreomyrrhis andicola, Endl., var. eriopoda, Hook.	55	200	nil	
Origanum Majorana, L. (Sweet marjoram)	3	100*	50	Vilmorin. Ext. limit, 7 yrs.
ditto	50	96	nil	
vulgare, L. (Common marjoram)	5	100*	50	Vilmorin. Ext. limit, 7 yrs.
ditto	42	250	nil	
Orites excelsa, R. Br.	12	15	nil	
Ornithogalum thyrsoides, Jacq.	50	47	nil	
Ornithopus sativus, Brot.	12		nil	Nobbe.
Orobanche major, Linn., var. elatior.	55	100	nil	
Orthoceros strictum, R. Br.	57	500	nil	
Oryza latifolia, Desv.	15	20	nil	A. de C.
sativa, Linn., var. monstrosa.	15	20	nil	A. de C.
Osmorhiza brevistylis, D. C.	67	47	nil	
Osteospermum moniliferum, L.	9	28	nil	
ditto	11	60	nil	Stony covering filed.
ditto	50	13	nil	

	Years old.	No. of Seeds.	Per cent. Germ.	
Ostrya virginica, Willd.	67	40	nil	
Oxalis microphylla, Phil.	57	100	nil	Sand-paper.
Oxylobium alpestre, F. v. M.	54	24	nil	
Callistachys, Benth.	25	44	82	Sw. only after 1 hr. in acid.
cuneatum, Benth., var. dilatatum.	50	20	5	
ellipticum, R. Br.	20	20	15	Sw. 1 hr. in acid. Cut. frills off.
ditto	63	26	19	1 hr. in acid. Cuticle frills off.
lineare, Benth.	27	60	40	Sw. only after $1\frac{1}{4}$ hr. in acid.
ditto	30	50	nil	
ditto	41	100	nil	10 min. in acid.
ditto	51	50	20	In 12 weeks, without filing.
ditto	58	50	nil	
parviflorum, Benth.	32	2	nil	Sw. in water.
ditto		21	5	Sw. after 2 hr. in acid.
trilobatum, Benth.	16	10	20	Sw. in water.
		45	35.5	In acid 3 hr.
ditto	49	25	4	Sw. after $1\frac{1}{2}$ hr. in acid.
Oxyria digyna, Hill., var. reniformis.	56	88	nil	
Paliurus aculeatus, Lam.			some	Mart. After 45 days in sea water.
Panax elegans, C. Moore and F. v. M.	12	100	nil	
sambucifolium, Sieber.	57	20	nil	
ditto, var. angustifolius.	54	15	nil	
ditto, var. dendroides.	50	50	nil	
Pancratium maritimum, Linn.			some	Mart. After 45 days in sea water.
Panicum, sp.	50	48	nil	
avenaceum, H. B. and K.	15	20	nil	A. de C.

	Years old.	No. of Seeds.	Per cent. Germ.	
capillare, Linn.	15	20	nil	A. de C.
Crus-galli, Linn.	32	550	nil	
ditto	57	100	nil	
ditto, var. echinatum, Willd.	12		3	Nobbe.
decompositum, R. Br.	57	60	nil	
depauperatum, Muhl.	67	112	nil	
divaricatissimum, R. Br., var. ammophilum.	55	50	nil	
glabrum, Gaud.	57	20	nil	
gracile, R. Br.	57	100	nil	
Isachne, Roth., var. eruciforme	15	20	nil	A. de C.
marginatum, R. Br.	54	60	nil	
melananthum, F. v. M.	54	100	nil	
miliaceum, Linn., var. album.	15	20	nil	A. de C.
miliacum, Linn., var. nigrum.	15	20	nil	A. de C.
persicum, Jensceh	12		nil	Nobbe.
prolutum, F. v. M.	57	150	nil	
sanguinale, L.	15	20	nil	A. de C.
semialatum, R. Br.	54	140*	nil	
virgatum, Linn.	1	30.5	36.5	Duvel. Buried deeply, 16 per cent.
Papaveraceæ.	25		nil	Becquerel.
Papaver.	many		some	Poisson.
Argemone, Linn.	15	20	nil	A. de C.
ditto	50	130	nil	
ditto	59	150	nil	
ditto	66	300	nil	

	Years old.	No. of Seeds.	Per cent. Germ.	
ditto	75	1000	nil	
ditto	79	300	nil	
bracteatum, Lindl.	41	500	nil	
ditto	50	200	nil	
dubium, Linn.	fresh	100	48	1 h. at 100 deg. C.; dry.
ditto	24	300	nil	
ditto	59	150	nil	
hybridum, Linn.	6	1000	nil	
ditto	15	20	nil	A. de C.
ditto	16	100	nil	
ditto	55	1000	nil	
ditto	66	500	nil	
nudicaule, Linn., var. coccineum.	17	1000	nil	
nudicaule, Linn., var. alpinum.	17	500	nil	
ditto, var. pyrenaicum, Willd.	41	100	nil	
orientale, L.	15	20	nil	A. de C.
ditto	41	500	nil	
ditto	50	210	nil	
persicum, Lindl.	30	81	nil	
Rhoeas, L.	fresh	100	62	1 h. at 100 deg. C.; dry.
ditto	15	20	nil	A. de C.
ditto	18	110	nil	
ditto	20?		few	Peter. Supp. time in soil.
Rhoeas, L., var. syriacum, Boiss.	54	88	nil	
somniferum, L.			many	D. After 28 days in sea water.
ditto			nil	D. After 54 days in sea water.

	Years old.	No. of Seeds.	Per cent. Germ.	
ditto	12	500	nil	
ditto	41	1000	nil	
ditto	50	200	nil	
ditto	50	450	nil	
ditto, var. setigerum, D. C.	59	500	nil	
Papaver, sp.	30		nil	Becquerel
Pappophorum commune, F. v. M.	47	50	nil	
ditto	57	200	nil	
ditto, var. urens, Lind.	54	55	nil	
Parthenium Hysterophorus, L.	15	20	nil	A. de C.
Paspalum scrobiculatum, L.	15	20	nil	A. de C.
ditto, L., var. orbiculare, Forst.	57	114	nil	
setaceum, Michx.	67	100	nil	
Patersonia longiscapa, Sweet.	50	40	nil	
Pavonia hastata, Cav.	50	17	nil	
ditto, var. Cleisocalyx, F. v. M.	57	20	nil	5 sw. H_2O. ; rest after 1 hr. in acid.
Pedicularis sylvatica, L.	58	250	nil	
Pentstemon campanulatus, Willd.	50	150	nil	
confertus, Dougl., var. procerus.	50	80	nil	
Hartwegii, Benth., var. gentianoides, Lindl.	50	100	nil	
Peplis Portula, L.	55	1000	nil	
ditto	58	120	nil	
Persoonia ferruginea, Sm.	54	18	nil	
juniperina, Labill.	57	13	nil	
lanceolata, Andr.	57	14	nil	

	Years old.	No. of Seeds.	Per cent. Germ.	
Petalostigma quadriloculare, F. v. M.	12	15	12.6	
ditto	23	41	nil	
Petrophila fastigiata, R. Br.	57	30	nil	
Peucedanum graveolens, Bth. and Hook.	3	100	50	Vilmorin. Ext. limit, 5 yrs.
palustre, Moench.	55	72	nil	
sativum, Bth and Hk. (Parnsip).	2	100*	50	Vilmorin. Ext. limit, 4 yrs.
ditto	1	55.5*	67 .	Duv. Buried deeply, 63 per cent.
ditto	57	100	nil	
ditto (Hollow crown Parnsip).	10	100	nil	
Phacelia arizonica, Gray.	23	110	nil	
congesta, Hook.	22	58	nil	
ditto	50	58	nil	
Whitlavia, A. Gray.	50	110	nil	
Phalaris arundinacea, Linn.	1	69*	8	Duvel. Buried deeply, 56 per cent.
ditto	57	100	nil	
canariensis. L.			most	D. After 70 days in sea water.
ditto			few	D. After 120 days in sea water.
ditto	15	20	nil	A. de C.
paradoxa, L.	15	20	nil	A. de C.
Phaseolus aconitifolius, L.	25	250	nil	
acutifolius, A. Gray.	21	16	nil	
coccineus, Moc. and Sesse. (Scarlet runner).	fresh	100	nil	Moist after 1 day at −10 deg. C.
lunatus, L.	10	12	nil	
lunatus, L. (Black pole).	10	25	nil	
lunatus, L. (Horticultural).	10	5	nil	

	Years old.	No. of Seeds.	Per cent. Germ.	
lunatus, L. (Burpees Dwarf).	10	8	nil	
lunatus, L. (Large white).	10	7	nil	
multiflorus, Willd.	12		nil	Nobbe.
Mungo, L., var. avies.	12	200	72	Began to germ. in 1 day after soaking in water at 22 deg. C.
Mungo, L.. var. Max.	12	70	98	Began to germ. in 1 day at 22 deg. C.
ditto	12	300	94	Began to germ. in 1 day at 22 deg. C.
Mungo, L., var. radicatus.	13	34	3	2 days at 30 deg. C., after 5 days soak.
ditto	45	16	nil	
Mungo, L., var. Roxburghii.	12	150	91	At 30 deg. C. in 2 days.
Mungo, L., var. viridissimus, Ten.	13	200	61	At 30 deg. C. in 1 day.
ditto	20	77	44	All sw. in water.
pilosus, H. B. and K.	10	100	98	Sw and began to germ. in 2 days.
ditto	12	200	94	
ditto	18	100	12	Sw. in water.
sativus (pitted) } = Medicago sativa.	12		75	Nobbe.
sativus (Black) }	12		nil	Nobbe.
violaceus, Moench.	15	20	nil	A. de C.
vulgaris, L. (Haricot).	fresh	100	84	Air dried; 15 per cent. H_2O.
ditto	fresh	100	60?	7 d. des. at 37 deg. C.; 4.68 per cent. H_2O.
ditto	fresh	100	2	45 d. des. at 37 deg. C.; 1.1 per cent. H_2C.
ditto	fresh	100	12	After 7 days in ster. oxygenless water.
ditto	fresh	100	nil	14 days in ster. oxygenless water.
ditto	fresh	100	39	Des. 7 days at 37 deg. C.
ditto	fresh	100	15	Des. 10 days at 37 deg. C.
ditto	fresh	100	3	Des. 14 days at 37 deg. C.

	Years old.	No. of Seeds.	Per cent. Germ.	
vulgaris, L.	fresh	100	95	5 days in oxygenless water.
ditto	fresh	100	nil	10 days in oxygenless water.
ditto	fresh	100	nil	After 1 day aqueous $HgCl_2$.
ditto	fresh	100	nil	After 21 days des. at 37 deg. C.
? (Beans).	2	10	20	Rom. Dried in air.
ditto	2	10	20	Rom. 1 yr, in O H N, CO or vacuo.
ditto	2	10	20	Rom. 1 yr. in water, ether or chloroform vapour.
ditto	2	10	nil	Rom. 1 yr. H_2S.
P. vulgaris, L.			nil	D. After 10 days in sea water.
ditto	1	97.5*	98-5	Duvel. All died in soil.
ditto (Kidney or French bean).	3	100*	50	Vilmorin. Ext. limit, 8 yrs.
vulgaris, L.	12		nil	Nobbe.
ditto	100		some	Girardin (Herb. Tournefort).
Phebalium Billardierii, A. de Juss.	57	46	nil	
Philadelphus coronarius, L.	50	400	nil	
coronarius, Linn., var. verrucosus	50	150	nil	
ditto, var. Zeyheri.	50	300	nil	
Gordonianus, Lindl.	50	350	nil	
grandiflorus, Willd., var. floribundus.	50	180	nil	
grandiflorus, Willd., var. speciosus.	50	200	nil	
Philotheca australis, Rudge.	57	30	nil	
Phleum asperum, Jacq.	61	80	nil	
pratense, L.	fresh		83	Nobbe.
ditto	3		53	Nobbe.
ditto	5		46	Nobbe.

	Years old.	No. of Seeds.	Per cent. Germ.	
tenue, Schrad.	15	20	nil	A. de C.
tuberosa, Linn.	50	13	nil	
Phlox Drummondii, Hook.			3	D. After 15 days in sea water.
			nil	D. After 25 days in sea water.
Pholidia divaricata, F. v. M.	57	50	nil	
Phormium tenax, Forst.	18	200	nil	
ditto	12	100	nil	
ditto	6	50	nil	
ditto	50	52	nil	
Phylacium bracteosum, Bennet.	17	40	nil	Sw. in water.
		3	33	Sw. after ½ hr. in acid.
Phylica plumosa, Linn.	50	32	nil	
Phyllanthus australis, Hook.	57	10	nil	
hirtellus, Muell. Arg.	57	100	nil	
lacunarius, F. v. M.	67	135	nil	
Niruri, Linn.	15	20	nil	A. de C.
trachyspermus, F. v. M.	57	35	nil	
Physalis Alkekengi, L.	35	100	nil	
peruviana, L. (Cape Gooseberry).	77	100	nil	
ditto	8	100*	50*	Vilmorin. Ext. limit, 10 yrs
ditto	50	160	nil	
Phyteuma campanuloides, Bieb.	50	82	nil	
Phytolacca, sp.			some	Thuret. After 13 m. fl. on sea water.
decandra, L.	15	20	nil	A. de C.
ditto, var. americana.	1	40.5*	88.5	Duvel. Buried deeply, 80 per cent.
dioica, L.	8	80	nil	

	Years old.	No. of Seeds.	Per cent. Germ.	
octandra, L.	57	64	nil	
ditto	61	100	nil	All sw. after 1 hr. in acid.
Picridium vulgare, Desf. (Cultivated sow-thistle).	5	100*	50	Vilmorin.
Picris hieracioides, L.	15	20	nil	A. de C.
ditto	15	200	nil	
ditto	55	130	nil	
hieracioides, L., var. squarrora.	64	200	nil	
Pimelea microcephala, R. Br.	47	50	nil	
pauciflora, R. Br.	51	100	nil	
Pimpinella Anisum, L. (Anise).	3	100*	50	Vilmorin. Ext. limit, 5 yrs.
integerrima, Benth. and Hook. f.	67	41	nil	
Pinus halepensis, Mill.	50	18	nil	
inops, Ait., var. virginiana.	1	18*	6.5	Duvel. All died in soil.
pinaster, Ait.	50	18	nil	
sylvestris, L.	2		60	Nobbe.
ditto	5		30	Nobbe.
Pisum sativum, Linn. (Peas).	fresh	100	80	5 days in abs. alc.
ditto	fresh	100	28	21 days in abs. alc.
ditto	fresh	100	16	49 days in abs. alc.
ditto	fresh	100	nil	63 days in abs. alc.
ditto	fresh	100	16	5 days $HgCl_2$ in abs. alc.
ditto	fresh	100	6	21 days $HgCl_2$ in abs. alc.
ditto	fresh	100	nil	42 days $HgCl_2$ in abs. alc.
ditto	fresh	100	40	49 days in 85-90 per cent. alc.
ditto	fresh	100	18	77 days in 85-90 per cent. alc.

	Years old.	No. of Seeds.	Per cent. Germ.	
ditto	fresh	100	44	35 days in dry H and N.
ditto	fresh	100	15	Des. 21 days at 37 deg. C.
ditto	fresh	100	nil	Des. 42 days at 37 deg. C.
ditto	fresh		few	D. After 11 days in sea water.
ditto	fresh		nil	D. After 14 days in sea water.
ditto	fresh		nil	D. After 13 days in pure water.
ditto	fresh	100	44	10 days in abs. alc.
ditto	fresh	100	40	14 days in abs. alc.
ditto	fresh	100	46	5 days in 50 per cent. alc.
ditto	fresh	100	30	14 days in 50 per cent. alc.
ditto	fresh	100	nil	10 days in watery $HgCl_2$.
ditto	fresh	100	60	5 days in oxygenless water.
ditto	fresh	100	nil	14 days in oxygenless water.
ditto	2	10	60	Rom. Dried in air.
ditto	2	10	10	Rom. 15 months in vacuo.
ditto	2	10	80	Rom. 1 yr. in O or N.
ditto	2	10	90	Rom. 1 yr. in H or water or ether vapour.
ditto	2	10	60	Rom. 1 yr. in CO or H_2S.
ditto	2	10		Rom. 1 yr. in chloroform vapour.
ditto	3	100	73	Air dried.
ditto	3	100	20	Air dried after 14 days in abs. alc.
ditto	fresh	100	70	After 7 d. in ster. oxygenless H_2O.
ditto	fresh	100	3	After 21 d. in ster. oxygenless H_2O.
ditto	fresh	100	nil	After 28 d. in ster. oxygenless H_2O.
ditto	fresh	100	70	After 2 soakings and dryings.

	Years old.	No. of Seeds.	Per cent. Germ.	
ditto	fresh	100	12	After 3 soakings and dryings.
ditto	fresh	100	5	2 d. aqueous $HgCl_2$, then 1 d. washing.
ditto	fresh		nil	D. After 5 days in sea water.
ditto	1	99*	98	Duvel. Buried; all died.
ditto	fresh		100	Nobbe.
ditto	3		88	Nobbe.
ditto	3	100*	50	Vilmorin. Ext. limit, 8 yrs.
ditto	4½	10	80	Jodin. Kept under mercury.
ditto	10¼	10	40	Jodin. Kept under mercury.
ditto (Poisgris).	8	100*	nil	Vilmorin. Dry in air.
ditto	10		33	Nobbe.
ditto	12		30	Nobbe.
sativum, L., var, arvense.	3	100*	50	Vilmorin. Ext. limit, 8 yrs.
Pithecolobium pruinosum, Bth.	16	4	nil	Sw. in water after 2 hr. in acid.
		37	21.6	
Pittosporum bicolor, Hook.	50	21	nil	
eugenioides, A. Cunn.	47	32	nil	
undulatum, Vent.	57	52	nil	
ditto	57	100	nil	
Plagianthus pulchellus, A. Gray.	57	100	nil	
spicatus, Benth.	54	200	nil	
Plantaginaceæ.	25		nil	
Plantago albicans, L.	63	88	nil	
arenaria, Waldst. and Kit.	41	100	nil	
ditto	70	50	nil	
ditto	73	200	nil	

	Years old.	No. of Seeds.	Per cent. Germ.	
argentea, Chaix., var. sericea.	77	25	nil	
Brownii, Rafin., var. carnosa.	57	33	nil	
ciliata, Desf.	40	500	nil	
Coronopus, L.	4	100*	50*	Vilmorin. Ext. limit, 9 yrs.
ditto	32	150	nil	
ditto	55	500	nil	
ditto	57	52	nil	
ditto	73	250	nil	
ditto	75	250	nil	
Cynops, L.	7	38	nil	
ditto	15	20	nil	A. de C.
ditto	87	80	nil	
Hugelii, Decne.	1	4*	5.5	Duvel. Buried deeply, 13.5 per cent.
Lagopus, var. vaginata, L	15	20	nil	A. de C.
lanceolata, L.	1	82.5*	78	Duvel. Buried deeply, 41 per cent.
ditto	15	20	nil	A. de C.
major, L., var. asiatica.	6	120	nil	
ditto	6	210	nil	
major, L.	1	24*	78	Duvel. Buried deeply, 46 per cent.
ditto	16	145	nil	
ditto	18?		few	Peter. Supp. age in soil.
ditto	20?		few	Peter. Supp. time in soil.
ditto	22	500	nil	
ditto	32?		few	Peter. supp. age in ground.
ditto	32	250	nil	
ditto	36	300	nil	

	Years old.	No. of Seeds.	Per cent. Germ.	
ditto	37	88	nil	
ditto	45?		some	Peter. Supp. time buried.
ditto	57	60	nil	
ditto	100?		few	Peter. Supp. age in ground.
ditto	300		nil	Nobbe. (Old Herb.).
maritima, L.	55	96	nil	
ditto	64	100	nil	
ditto	83	149	nil	
maxima, Jacq.	15	20	nil	A. de C.
media, Linn.	15	20	nil	A. de C.
varia, R. Br.	54	100	nil	
ditto, var. leiostachys, F. v. M.	59	100	nil	
Platylobium obtusangulum, Hook., var. macrocalyx.	51	30	nil	
Plectranthus fruticosus, L. Herit.	15	20	nil	A. de C.
parviflorus, Willd.	57	48	nil	
ditto	15	20	nil	A. de C.
Plumbaginaceæ.	25		nil	Becquerel.
Poa annua, L.	12	500	nil	
ditto	18?		few	Peter. Supp. age in soil.
ditto	22?		few	Peter. Supp. age in soil.
ditto	25	250	nil	
caespitosa, Forst. f., var. australis.	35	53	nil	
ditto	37	164	nil	
ditto	57	100	nil	
ditto	57	160	nil	

	Years old.	No. of Seeds.	Per cent. Germ.	
compressa, L.	14	450	nil	
ditto	20?		few	Peter. Supp. age in soil.
nemoralis, L.	12	250	nil	
ditto	14	400	nil	
ditto	36?		few	Peter. Supp. age in soil.
ditto	50	180	nil	
ditto	100?		few	Peter. Supp. age in soil.
ditto, var. brizochloa, F. v. M.	57	47	nil	
pratensis, L.	fresh		95	Kinzel. In light at 20 deg. C.
ditto			nil	Kinzel. Darkness at 20 deg. C.
ditto	1	91*	87	Duvel. Buried deeply, 24.5 per cent.
Podalyria calyptrata, Willd., var. styracifolia, Sims.	50	26	nil	
ditto	51	26	3.8	
sericea, R. Br.	51	97	1	
Podocarpus alpina, R. Br.	57	50	nil	
elata, R. Br.	8	12	nil	
ditto	57	20	nil	
Podolepis canescens, A. Cunn., var. affinis, Sond.	57	180	nil	
longipedata, A. Cunn., var. hieracioides, F. v. M.	54	800	nil	
ditto, var. Mitchellii, Sond.	57	450	nil	
rugata, Labill.	50	35	nil	
Poinciana regia, Boj.	9	19	47.4	Outer thin skin impermeable until filed.
Polycarpaea Teneriffae, Lam.	15	20	nil	A. de C.

	Years old.	No. of Seeds.	Per cent. Germ.	
Polygala myrtifolia, Linn.	50	47	nil	
polygama, Walt.	67	52	nil	
Senega, Linn.	67	100	nil	
Polygonaceæ.	25		nil	Becquerel.
Polygonum amphibium, L.	ripe		nil	Coats intact. Crocker.
ditto	ripe		85	Coats broken. Crocker.
aviculare, L.	18	150	nil	
ditto	20?		few	Peter. Supp. time buried.
ditto	22?		few	Peter. Supp. time buried.
ditto	53	51	nil	
Convolvulus, L.	20?		few	Peter. Supp. time buried.
ditto	22	125	nil	
ditto	32	55	nil	Sand-p.
ditto	36?		few	Peter. Supp. age in soil.
dumetorum, L.	50	58	nil	
dumetorum, L., var. scandens.	1		nil	Duvel. If buried, died.
hydropiperoides, Michx.	67	80	nil	
lapathifolium, Linn., var. glandulosum.	54	50	nil	
ditto	57	500	nil	
maritimum, L.	55	48	nil	
minus, Huds.	57	65	nil	
orientale, L.	15	20	nil	A. de C.
pensylvanicum, L.	1		nil	Duvel. If buried, died.
ditto	67	104	nil	
Persicaria, L.	1		nil	Duvel. If buried, died.
ditto	49	51	nil	

	Years old.	No. of Seeds.	Per cent. Germ.	
Roberti, Loisel.	57	42	nil	
Roberti, Loisel, var. Raii, Bab.	61	32	nil	
subsessile, R. Br.	54	25	nil	
virginianum, Linn.	67	60	nil	
viviparum, L.	50	38	nil	
Pomaderris elliptica, Labill.	50	120	nil	
ditto	57	100	nil	
elliptica, Labill. (malifolia).	50	36	nil	
ligustrina, Sieb.	57	100	nil	
obcordata, Fenzl.	54	100	nil	
phylicaefolia, Lodd.	57	100	nil	
phylliraeoides, Sieber.	50	32	nil	
racemosa, Hook.	57	150	nil	
subrepanda, F. v. M.	50	120	nil	
Portulaca grandiflora, Hook.	50	110	nil	
oleracea, Linn. (Purslane).	1	84*	91.5	Duvel. Buried deeply, 39 per cent.
ditto	7	100*	50	Vilmorin. Ext. limit, 10 yrs.
ditto	50	2670	nil	
ditto	57	150	nil	
pilosa, Linn.	15	20	nil	A. de C.
Potamogeton coloratus, Hornem., var. plantagineus.	50	100	nil	
filiformis, Rafin.	56	28	nil	
marinus, L.	54	32	nil	
natans, L.	55	130	nil	
ditto	ripe		nil	Coats intact. Crocker.
ditto	ripe		51	Coats broken. Crocker.

	Years old.	No. of Seeds.	Per cent. Germ.	
obtusifolius, M. and K.	57	18	nil	
pectinatus, L.	ripe		nil	Coats intact. Crocker.
ditto	ripe		53	Coats broken. Crocker.
pusillus, L.	55	90	nil	
ditto	58	30	nil	
zosterifolius, Schum.	55	40	nil	
Potentilla alpestris, L.	50	51	nil	
aurea, Linn., var. argentea.	55	200	nil	
inclinata, Vill.	50	106	nil	
Macnabiana, Lem.	50	112	nil	
micrantha, Ram.	50	32	nil	
norvegica, L.	67	250	nil	
ditto, var. monspeliensis, L.	1	41*	83	Duvel. Buried deeply, 21.5 per cent.
pensylvanica, L., var. bipinnatifolia, Doug.	50	170	nil	
ditto	50	250	nil	
recta, L.	50	160	nil	
rupestris, L.	50	120	nil	
Sibbaldi, Hall, f.	56	62	nil	
Tormentilla, Neck.	17	180	nil	
ditto	20?		few	Peter. Supp. time in soil.
ditto	30	75	nil	
ditto	30*		nil	Becquerel.
ditto	32?		few	Peter. Supp. age in ground.
ditto	52	68	nil	
ditto	100?		many	Peter. Supp. age in soil.

	Years old.	No. of Seeds.	Per cen Germ.	
verna, Linn., var. pilosa, Kitt.	50	88	nil	
Poterium canadense, A. Gray.	15	20	nil	A. de C.
Sanguisorba, L. (Garden-burnet).	2	100*	50	Vilmorin. Ext. limit, 6 yrs.
Sanguisorba, L.	50	140	nil	
Priestleya villosa, D. C. (formulosa).	50	31	nil	
Primula mollis, Nutt.	50	160	nil	
Priva hispida, Juss., var. mexicana, Pers.	15	20	nil	A. de C.
Prostanthera lasianthos, Labill.	50	70	nil	
ditto	55	52	nil	
melissifolia, F. v. M.	57	28	nil	
microphylla, A. Cunn., var. coccinea, F. v. M.	57	40	nil	
nivea, A. Cunn.	50	150	nil	
ditto	57	100	nil	
rotundifolia, R. Br. (retusa).	57	100	nil	6 weeks moist, then $\frac{1}{2}$ hr. in acid.
ditto	57	100	nil	In acid $\frac{1}{3}$ hr.
spinosa, F. v. M.	57	72	nil	
Protea mellifera, Thunb.	50	14	nil	
Prunella vulgaris, L.	22	58	nil	
ditto	36?		few	Peter. Supp. time in soil.
ditto	45?		few	Peter. Supp. time buried.
ditto	50	44	nil	
Prunus serotina, Ehrh.	27	18	nil	
ditto	67	15	nil	
Pseudanthus ovalifolius, F. v. M., var. brachyandrus.	57	120	1.7	Partial germination only.

	Years old.	No. of Seeds.	Per cent. Germ.	
Psidium Donianum, Berg. (aromaticum).	15	20	nil	A. de C.
Psoralea adscendens, F. v. M.	57	35	nil	Imp. ripe.
aphylla, Linn.	50	50	nil	
argophylla, Pursh. (incana).	50	28	nil	
bituminosa, Linn.	50	71	nil	
glandulosa, Linn.	50	16	nil	
patens, Lindl., var. australasica.	50	52	nil	
ditto	57	50	nil	Imp. ripe.
pinnata, Linn.	51	48	10.4	Most germ. without filing after prolonged soaking.
striata, Thunb.	50	41	nil	
Psychotria loniceroides, Sieber.	10	85	nil	
Pterostylis pedunculata, R. Br.	55	500	nil	
Pultenaea baeckeoides, A. Cunn.	57	80	2.5	In acid 1 hr.
daphnoides, Wendl.	12	20	35	Sw. after 2½ hr. in acid.
ditto	19	100	7	
ditto	50	21	nil	
retusa, Sm.	10	100	62	In acid 1½ hr.
ditto	22	50	4	In acid 1½ hr.
ditto	57	50	nil	
stipularis, Sm.	12	50	48	1 hr. in acid.
ditto	16	25	8	1 hr. in acid.
subumbellata, Hook.	57	18	nil	
villosa, Willd.	16	5	nil	Sw. in water.
		48	25	In acid 2 hr.
Pyrus arbutifolia, Linn. f.	50	14	nil	

	Years old.	No. of Seeds.	Per cent Germ	
ditto, var. depressa, Lindl.	50	15	nil	
ditto, var. floribunda, Lindl.	50	19	nil	
ditto, var. pubens, Lindl.	50	18	nil	
Aria, Ehrh., var. undulata.	50	26	nil	
Aucuparia, Ehrh. (saturigifolia).	50	30	nil	
coronaria, Linn.	23		some	Arthur. Supp. age in soil.
prunifolia, Willd. (hybrida).	50	15	nil	
Spuria, D. C.	50	80	nil	
Quercus Robur, Linn.	1		nil	Wiesner.
ditto	1	100	nil	
ditto	fresh	100	86	
ditto, var. sessiliflora, Salisb.	1	100	nil	
ditto	fresh	100	74	
Quisqualis indica, L.	8	2	nil	
Radiola Linoides, Roth. (Millegrana).	51	80	nil	
Ranunculaceæ.	25		nil	Becquerel.
Ranunculus anemoneus, F. v. M.	57	82	nil	
aquatilis, L.	56	32	nil	
arvensis, L.	56	51	nil	
bulbosus, L.	15	20	nil	A. de C.
Ficaria, L.	1	100	nil	Kept in desiccator at 10-20 deg. C.
ditto	3	150	nil	Air dried.
ditto	2	100	nil	
lappaceus, Sm., var. multiscapus, Hook. f.	57	100	nil	
ditto, var. pimpinellifolius, Hook.	57	41	nil	

	Years old.	No. of Seeds.	Per cent. Germ.		
lappaceus, Sm., var. scapigerus, Hook.	57	48	nil		
multiscapus, J. Hook.	57	40	nil		
muricatus, L.	15	20	nil	A. de C.	
ditto	50	64	nil		
ditto	57	57	nil		
parviflorus, L.	15	20	nil	A. de C.	
ditto	50	110	nil		
ditto	58	92	nil		
ditto, var. sessiliflorus.	57	63	nil		
plebeius, R. Br., var. hirtus, B. and Sol.	54	71	nil		
ditto	27	38	nil		
ditto	37	40	nil		
recurvatus, Poir.	60	88	nil		
repens, L.	14	85	nil		
ditto	18	106	nil		
ditto	20?		many	Peter.	Supp. time in soil.
ditto	28	44	nil		
ditto	36?		some	Peter.	Supp. time in soil.
ditto	45?		many	Peter.	Supp. time buried.
ditto	50	80	nil		
ditto	100?		few	Peter.	Supp. age in soil.
ditto	71	56	nil		
ditto	64	52	nil		
repens, L., var. philonitis, Pursh.	50	25	nil		

	Years old.	No. of Seeds.	Per cent Germ		
rivularis, B. and S.	57	44	nil		
ditto, var. glabrifolius, Hook.	57	61	nil		
sceleratus, L.	50	63	nil		
ditto	25	65	nil		
trichocarpus, Boiss. and Kotschy.	50	17	nil		
trichophyllus, Chaix.	55	39	nil		
ditto, var. paucistamineus, Tausch.	55	76	nil		
trilobus, Desf.	50	34	nil		
velutinus, Tenore.	50	17	nil		
Raphanus Raphanistrum, L.	2	10	40	Rom.	Air dried.
ditto	2	10	80	Rom.	15 hr. in vacuo.
ditto	2	10	10	Rom.	1 yr. in OH or CO.
ditto	2	10	90	Rom.	1 yr. in N.
ditto	2	10	nil	Rom.	1 yr. in H_2S.
ditto	2	10	60	Rom.	1 yr. in water vapour.
ditto	2	10	40	Rom.	1 yr. in ether vapour.
ditto	2	10	80	Rom.	1 yr. in chloroform vapour.
ditto	18?		few	Peter.	Supp. age in soil.
ditto	36?		few	Peter.	Supp. age in soil.
ditto	50	110	nil		
sativus, L. (Radish).		30	6	D.	After 85 days in sea water.
ditto			nil	D.	After 50 days in cold sea water.
ditto	5	100*	50	Vilmorin.	Ext. limit, 10 yrs.
ditto	7	200	74		
Ratonia pyriformis, Benth. and Hook. f.	57	100	nil		
Reseda alba, Linn., var. fruticulosa, L.	50	80	nil		

	Years old.	No. of Seeds.	Per cent Germ.	
lutea, L.	55	200	nil	
ditto	57	100	nil	
odorata, L.	15	20	nil	A. de C.
Rhagadiolus edulis, Gaertn., var. stellatus.	50	12	nil	
Rhagodia Billardieri, R. Br.	54	100	nil	Sand-papered.
Rhamnus Frangula, L.	55	40	nil	
Rheum officinale, Baill. (Rhubarb).	3	100*	50	Vilmorin. Ext. limit, 8 yrs.
Rhaponticum, Linn.			many	D. After 82 days in sea water.
Rhizophora mucronta, Lam.			some	Hemsley. Many m. fl. on sea water.
ditto	1	50	nil	Dried in air.
Rhodosphaera rhodanthema, Engl.	15	22	nil	
Rhus lucida, Linn.	15	20	nil	A. de C.
venenata, D. C.	67	51	nil	
Rhynchosia minima, D. C.	14	11	nil	Sw, in water.
		9	33	Sw. after 1 hr. in acid.
ditto	18	25	8	Sw. after 1 hr. in acid.
nummularia, D. C.	36		some	Becquerel.
volubilis, Lour.	37	5	nil	Sw. in water.
		10	nil	Sw. after 1 hr. in acid.
Rhynchospora glomerata, Vahl.	67	160	nil	
Ribes sanguineum, Pursh.	50	10	nil	
ditto, var. atrosanguineum.	50	30	nil	
ditto, var. glutinosum.	50	34	nil	
Ricinocarpus pinifolius, Desf., var. sidaeformis.	50	16	nil	

	Years old.	No. of Seeds.	Per cent. Germ.	
Ricinus communis, L., var. africanus.			some	Mart. After 93 d. fl on sea water.
communis, Linn.	fresh	100	40	Des. 28 days to 0.92 per cent. H_2O.
ditto			some	D. After 30 days in sea water.
ditto			some	Mart. After 93 d. fl. on sea water.
ditto	50	10	nil	
Rivina humilis, Linn., var. brasiliensis.	15	20	nil	A. de C.
Robinia pseudacacia, L.	1	14	11.5	Duvel. Buried in soil; all died.
Romulea neglecta, Jord. and Fourr.	15	20	nil	A. de C.
ramiflora, Tenore.	15	20	nil	A. de C.
rosea, Eckl.			some	Berkeley. After 1 month in sea water.
Rosa gallica, Linn., var. virescens, Desegl.	50	11	nil	
lucida, Ehrb.	60	82	nil	
montana, Chaix.	50	24	nil	
procera, Hort.	50	32	nil	
rubiginosa, Linn., var. latifolia.	50	16	nil	
spinosissima, L.	56	60	nil	
turbinata, Ait.	50	15	nil	
Rosaceæ.	25		nil	Becquerel.
Rosmarinus officinalis, L. (Rosemary).	2	100*	50	Vilmorin.
Rubia tinctorum, Linn.	50	34	nil	
Rubus chamaemorus, L.	56	31	nil	
Idaeus, L.	18	98	nil	
ditto	30	68	nil	
ditto	30		nil	Becquerel.
ditto	35?		few	Peter. Supp. age in soil.
ditto	36?		few	Peter. Supp. time in soil.

	Years old.	No. of Seeds.	Per cent. Germ.	
ditto	45?		few	Peter. Supp. time buried.
ditto	50	120	nil	
ditto	100?		few	Peter. Supp. age in soil.
ditto	2000		some	Lindley. Supp. age in soil.
parvifolius, Linn., var. macropodus, Seringl.	57	20	nil	
parvifolius, L.	37	25	nil	
ditto	37	50	nil	
rosaefolius, Sm.	57	100	nil	
rosaefolius, Sm., var. Eglanteria.	57	100	nil	
Rudbeckia amplexicaulis, Vahl.	50	45	nil	
hirta, L.	1	65	78	Duvel. Buried in soil, 7 per cent.
ditto	50	45	nil	
laciniata, L.	50	36	nil	
Rulingia parviflora, Endl.	50	41	nil	
Rumex, Acetosa, L. (Sorrel).	2	100*	50	Vilmorin. Ext. limit, 4 yrs.
Acetosella, L.	15	150	nil	
ditto	18?		some	Peter. Supp. age in soil.
ditto	25	130	nil	
acutus, Linn., var. pratensis.	55	120	nil	
alpinus, L.	69	108	nil	
angustifolius, Campd.	57	150	nil	
aquaticus, L.			some	Mart. After 93 d. fl. on sea water.
ditto	50	120	nil	
crispus, L.	1	81*	83.5	Duvel. Buried deeply, 79 per cent.
ditto	59	150	nil	

	Years old.	No. of Seeds.	Per cent. Germ.	
Hydrolapathum, Huds.	15	20	nil	A. de C.
ditto	55	100	nil	
littoralis, H. B. and K.	15	20	nil	A. de C.
Lunaria, Linn.	15	20	nil	A. de C.
maritimus, Linn.	55	250	nil	
nemorosus, Schrad.	22	45	nil	
ditto	35?		few	Peter. Supp. age in soil.
obtusifolius, Linn.	1	97.5*	95.5	Duvel. Buried deeply, 79 per cent.
palustris, Sm.	56	100	nil	
Patientia, L. (Patience dock).	4	100*	50	Vilmorin. Ext. limit, 6 yrs.
Pulcher, L.	55	100	nil	
salicifolius, Wienm.	1	98*	96	Duvel. Buried deeply, 70 per cent.
verticillatus, L.	67	38	nil	
Ruta graveolens, L. (Rue).	4	100*	50	Vilmorin. Ext. limit, 6 yrs.
Rutidosis Pumilo, Benth.	57	500	nil	
Sagina maritima, Don.	30	250	nil	
ditto	56	1000	nil	
nodosa, Fenzl.	41	740	nil	
ditto	54	550	nil	
procumbens, Linn.	16	250	nil	
ditto	30		nil	Becquerel.
ditto	18?		many	Peter. Supp. age in soil.
ditto	25	120	nil	
ditto	35?		few	Peter. Supp. age in soil.
ditto	36?		few	Peter. Supp. time in soil.
ditto	41	2000	nil	

	Years old.	No. of Seeds.	Per cent. Germ.	
ditto	45?		few	Peter. Supp. time buried.
ditto	50	500	nil	
ditto	100?		few	Peter. Supp. age in soil.
ditto	30*		nil	Becquerel.
Sagittaria sagittifolia, L.	10		many	Fischer. After treatment with dil. acid.
ditto	10		many	Fischer. After treatment with dil. acid.
ditto	1	varied	50-90	Fischer. After treatment with dil. acid.
ditto	1	100	68	After light sandpapering and moisture at 25-30 deg. C. None living after 3 weeks.
ditto	1	1400	0.1	Fischer. During 1 yr. in clear water.
ditto	10	1320	2.8	Fischer. During 1 yr. in clear water.
ditto	1	7000	5.7	Fischer. Water slightly soured.
platyphylla, J. G. Smith.	1	4300	0.7	Fischer. During 1 yr. in water.
variabilis, Engelm.	ripe		nil	Coats intact. Crocker.
ditto	ripe		92	Coats broken. Crocker.
Sagus, sp.	fresh		some	Moseley. After months in sea water.
Salicornia Bigelowii, Torr., var.	67	100	nil	
Salix.	fresh		nil	After thorough drying.
Salsola Kali, L.	fresh		some	Mart. After 45 d. fl. on sea water.
ditto	67	21	nil	
Salvia Aethiopis, L.	15	20	nil	A. de C.
ditto	50	53	nil	
algeriensis, Desf.	50	25	nil	
argentea, L., var. orientalis	50	15	nil	
foetida, Lam., var. tingitana.	15	20	nil	A. de C.

	Years old.	No. of Seeds.	Per cent. Germ.	
glutinosa, L.	50	16	nil	
hirsuta, Jacq.	15	20	nil	A. de C.
hispanica, Linn.	15	20	nil	A. de C.
indica, Linn.	15	20	nil	A. de C.
lanceolata, Brouss.	15	20	nil	A. de C.
officinalis, L. (Garden sage).	3	100*	50	Vilmorin. Ext. limit. 5 yrs.
plebeia, R. Br.	50	240	nil	
ditto	57	200	nil	Softened in water.
pratensis, Linn.	57	20	nil	
Sclarea, L. (Clary).	3	100*	50	Vilmorin.
ditto	15	20	nil	A. de C.
ditto	50	49	nil	
ditto	50	55	nil	
spinosa, L.	50	148	nil	
verbascifolia, Bieb.	50	35	nil	
Verbenaca, L.	55	110	nil	
verticillata, Linn.	15	20	nil	A. de C.
ditto	50	72	nil	
verticillata, Linn., var. napifolia.	15	20	nil	A. de C.
viridis, Linn.	50	32	nil	
viscosa, Jacq.	15	20	nil	A. de C.
Sambucus nigra, L.	18	82	nil	
ditto	50	32	nil	
racemosa, L.	12	140	nil	
ditto	100?		few	Peter. Supp. age in soil.
xanthocarpa, F. v. M.	57	40	nil	

	Years old.	No. of Seeds.	Per cent. Germ.	
Samolus littoralis, Schrank.	57	45	nil	
repens, Pers., var. parviflorus.	57	150	nil	
Valerandi, L.	57	160	nil	
ditto, var. floribundus, H. B. and K.	57	250	nil	
Santalum lanceolatum, R. Br.	17	44	nil	
Santolina chamaecyparissus, L.	50	450	nil	
rosmarinifolia, Linn.	50	170	nil	
viridis, Willd.	50	190	nil	
Sapindus Saponaria, L.			some	Hemsley. After months in sea water.
Saponaria Vaccaria, L.	15	20	nil	A. de C.
ditto	1	6.5*	88	Duvel. Buried in soil, 7 per cent.
Satureia hortensis, L. (Summer savory).	fresh		3	D. After 42 days in sea water.
ditto	3	100*	50	Vilmorin. Ext. limit, 7 yrs.
ditto	15	20	nil	A. de C.
montana, L. (Winter savory).	3	100*	50	Vilmorin. Ext. limit, 6 yrs.
Saussurea japonica, D. C.	15	20	nil	A. de C.
Saxifraga, var.	50	500	nil	
aizoides, Linn.			nil	D. After 30 days in sea water.
ajujifolia, L.	50	25	nil	
caespitosa, L., var. incurvifolia, Don.			nil	D. After 30 days in sea water.
Geum, L.	50	75	nil	
marginata, Sternb.	50	100	nil	
umbrosa, L.	57	106	nil	
Saxifragaceæ.	25		nil	Becquerel.
Scabiosa arvensis, L.	66	120	nil	
ditto	18	48	nil	
ditto	50	11	nil	

	Years old.	No. of Seeds.	Per cent. Germ.	
graminifolia, Linn.	50	32	nil	
maritima, Linn.	50	86	nil	
ditto	fresh		some	Mart. After 45 d. fl. on sea water.
maritima, Linn., var. atropurpurea, Linn.	50	11	nil	
succisa, Linn.	15	20	nil	A. de C.
Scaevola Hookeri, F. v. M.	15	40	5	
suaveolens, R. Br.	54	32	nil	
Schinus dependens, Orteg.	15	20	nil	
molle, Linn.	8	40	nil	
Schotia latifolia, Jacq.	8	5	nil	After filing integ. outer transp. layer scales off on swelling.
Scirpus Eriophorum, Michx.	67	1000	nil	
lacustris, L.	51	100	nil	
maritimus, L.	57	150	nil	Sand-papered.
nodosus, Rottb.	57	30	nil	
setaceus, L.	60	120	nil	
Scleranthus annuus, L.	16	85	nil	
ditto	18?		few	Peter. Supp. age in soil.
ditto	50	200	nil	
biflorus, Hook. f.	56	100	nil	
ditto	57	100	nil	
mniaroides, F. v. M.	57	50	nil	
ditto	57	50	nil	
Scleria ciliata, Michx.	67	20	nil	
Sclerocarpus uniserialis, Bth. & Hook f.	50	21	nil	

	Years old.	No. of Seeds.	Per cent. Germ.	
Sclerolaena biflora, R. Br.	57	14	nil	
dicantha, Bth.	57	150	nil	
paradoxa, R. Br.	57	36	nil	
ditto	57	45	nil	
Sclerothamnus diffusus, F. v. M. (Eutaxia)	50	29	nil	
Scolymus hispanicus, L. (Golden thistle).	3	100*	50	Vilmorin. Ext. limit, 7 yrs.
Scorpiurus muricata, Linn., var. vermiculata.	6	100*	50	Vilmorin. Ext. limit, 10 yrs.
vermiculata, L.	6	100*	50	Vilmorin. Ext. limit, 10 yrs.
Scorzonera hispanica, L. (Scorzonera).	2	100*	50	Vilmorin. Ext. limit, 7 yrs.
Scrophularia aquatica, Linn.	15	20	nil	A. de C.
nodosa, Linn.	50	100	nil	
ditto	12	500	nil	
ditto	100?		few	Peter. Supp. age in soil.
ditto	58	1000	nil	
vernalis, Linn.	58	1000	nil	
Scrophulariaceæ.	25		nil	Becquerel.
Scutellaria alpina, L.	50	22	nil	
Sebaea albidiflora, F. v. M.	54	100	nil	
ovata, R. Br.	37	250	nil	
ditto	55	100	nil	
Secale cereale, L. (Rye).	1	100*	98.5	Duvel. If buried, all died.
ditto	2		nil	Wiesner
ditto	2		most	Rohde.
ditto	fresh		100	Nobbe.
ditto	2		87	Nobbe.

	Years old.	No. of Seeds.	Per cent. Germ.	
ditto	5		26	Nobbe.
ditto	2	100	48	Haberlandt.
ditto	3	100	nil	Haberlandt.
ditto	6	100	74	Haberlandt.
ditto	8	100	6	Haberlandt.
ditto	10	100	nil	Haberlandt.
ditto	4	100	78	Burgerstein. Dry in air.
ditto	4	25	32	From Vict. Agric. Dept.
ditto	7	100	35	
ditto	10	100	2	
ditto	50	120	nil	
ditto	100		some	Stated by Hemsley.
Securigera Coronilla, D. C.	50	14	nil	
Sedum Ewersii, Ledeb. (rubrum).	50	200	nil	
maximum, Suter. (latifolium).	50	60	nil	
Selinum sylvestre, Linn. (lineare).	15	20	nil	A. de C.
Sempervivum globiferum, L., var. soboliferum, Sims.	50	600	nil	
Senebiera Coronopus, Poir.	62	100	nil	
pinnatifida, D. C., var. didyma.	58	131	nil	
ditto	50	160	nil	
Senecio Fuchsii., C. C. Gmel.	100?		few	Peter. Supp. age in soil.
halimifolius, L.	50	300	nil	
lautus, Soland. (macquariensis).	55	100	nil	
sarracenicus, Linn.	59	1000	nil	
spathulatus, A. Rich.	57	100	nil	

	Years old.	No. of Seeds.	Per cent. Germ.	
sylvaticus, Linn.	indef.		some	Michalet. In soil.
ditto	12	500	nil	
ditto	19	250	nil	
ditto	54	200	nil	
ditto	55	52	nil	
ditto	69	64	nil	
ditto	81	128	nil	
viscosus, L.	57	80	nil	
vulgaris, L.	55	200	nil	
Serratula coronata, L.	50	17	nil	
Sesbania aculeata, Poir.	15	20	nil	A. de C.
ditto, var. australis, F. v. M.	57	100	nil	All sw. in water.
aegyptiaca, Poir.	61	58	nil	
punicea, Bth.	50	40	nil	
Setaria glauca, Beauv.	54	50	nil	
glauca, H. B. and K.	1	56*	37.5	Duvel. Buried.
ditto	1	56*	1	
italica, Beauv.	15	20	nil	A. de C.
ditto	22	400	nil	
ditto	18	200	nil	
ditto	52	800	nil	
macrochaeta, Spreng.	15	20	nil	A. de C.
macrostachya, H. B. and K.	15	20	nil	A. de C.
verticillata, Beauv.	15	20	nil	A. de C.
ditto	1	93*	94.5	Duvel. Buried deeply, 90 per cent.

	Years old.	No. of Seeds.	Per cent. Germ.	
viridis, Beauv.	57	2000	nil	
ditto	61	80	nil	
ditto	61	144	nil	
Sherardia arvensis, L.	61	42	nil	
Sida corrugata, Lindl.	55	30	nil	
ditto, var. humillima, F. v. M.	57	50	nil	
ditto, var. trichopoda, F. v. M.	57	20	nil	
glomerata, Cav., var. molle, Rich.	50	48	nil	
hastata, A. St. Hil.	15	20	nil	A. de C.
intricata, F. v. M.	57	30	3.3	14 sw. after ½ hr. in acid; rest in water.
Siegesbeckia orientalis, L., var. microcephala, D. C.	57	50	nil	
orientalis, L.	35	100	nil	
ditto	57	100	nil	
Silene antirrhina, L.	15	20	nil	A. de C.
apetala, Willd.	15	20	nil	A. de C.
atocioides, Boiss.			some	Thuret. After 13 m fl. on sea water.
cerastoides, Linn.	15	20	nil	A. de C.
compacta, Fisch.			some	Berkeley. After 30 days in sea water.
conica, Linn.	15	20	nil	A. de C.
ditto	52	81	nil	
conoidea, Linn.	15	20	nil	A. de C.
fruticosa, L.	15	20	nil	A. de C.
gallica, L., var. anglica, L.	56	63	nil	
ditto	15	20	nil	A. de C.
gallica, L., var. quinquevulnera, L.	15	20	nil	A. de C.

	Years old.	No. of Seeds.	Per cent. Germ.	
juvenalis, Del.	·1500		some	V. Heldreich. Supp. age in soil.
maritima, With.	55	59	nil	
noctiflora, L.	15	20	nil	A. de C.
ditto	55	71	nil	
ditto	57	120	nil	
nutans, L.	51	200	nil	
pendula, L.	50	92	nil	
perfoliata, L., var. erythrocaulon.	50	17	nil	
tartarica, Pers.	50	90	nil	
tricuspidata, Desf.	15	20	nil	A. de C.
trifoliatum, L.	15	20	nil	A. de C.
vespertina, Retz.	15	20	nil	A. de C.
Sinapis arvensis, L.	30		nil	Becquerel.
Sisymbrium altissimum, L.	1	88*	86	Duvel. Buried deeply, 26 per cent.
austriacum, Jacq., var. acutangulum, D. C.	15	20	nil	A. de C.
canescens, Nutt.	50	104	nil	
cardaminoides, F. v. M.	29	100	nil	
ditto	59	200	nil	
Irio, L.	65	200	nil	
Loeselii, Linn., var. hirsutum.	15	20	nil	A. de C.
Sophia, L., var. persicum.	15	20	nil	A. de C.
strictissimum, L.	50	102	nil	
Thalianum, J. Gay.	18?		few	Peter. Supp. age in soil.
ditto	59	100	nil	
ditto	67	120	nil	

	Years old.	No. of Seeds	Per cent. Germ.		
Sisyrinchium convolutum, Nocca.	50	180	nil		
iridifolium, H. B. and K.			some	Berkeley.	After 1 month in sea water.
striatum, Sm.	50	60	nil		
Sium Sisarum, L.	3	100*	50	Vilmorin.	Ext. limit, 4 yrs.
Smilax australis, R. Br., var. spinescens, Mig.	57	19	nil		
glyciphylla, Sm.	57	100	nil		
Solanaceæ.	25	100	nil	Becquerel.	
Solanum aculeatissimum, Jacq., var. ciliatum, Willd.	15	20	nil	A. de C.	
auriculatum, Ait.	50	210	nil		
aviculare, Forst. f., var. vescum, F. v. M.	57	42	nil		
discolor, R. Br., var. minus.	54	30	nil		
Dulcamara, Linn.	50	28	nil		
giganteum, Jacq.	50	130	nil		
Hystrix, R. Br.	50	85	nil		
Melongena, L.			some	Berkeley.	After 30 days in sea water.
Melongena, L. (Egg-plant).	6	100*	50	Vilmorin.	Ext. limit, 10 yrs.
ditto	50	40	nil		
nigrum, L.	1	97*	91	Duvel.	Buried in soil, 12 per cent.
nigrum, L. (Nightshade).	5	100*	50	Vilmorin.	Ext. limit, 8 yrs.
ditto	50	50	nil		
nigrum, L., var. chlorocarpum.	57	110	nil		
pseudocapsicum, L.	50	37	nil		
pungetium, R. Br.	57	83	nil		

	Years old.	No. of Seeds.	Per cent. Germ.	
simile, F. v. M.	56	200	nil	
sodomaeum, L.	51	105	1	
tomentosum, L.	15	20	nil	A. de C.
tuberosum, L.			many	D. After 70 days in sea water.
ditto			fewer	D. After 100 days in sea water.
ditto			nil	D. After 120 days in sea water.
Zuccagnianum, Dun.	15	20	nil	A. de C.
*Solidago, various sp.	20			Supp. age in soil.
Virgaurea, Linn.	12	250	nil	
ditto	25	200	nil	
Sonchus arvensis, Linn.	10	500	nil	
ditto	15	350	nil	
ditto	36?		few	Peter. Supp. time in soil.
ditto	45?		few	Peter. Supp. time buried.
ditto	50	250	nil	
oleraceus, Linn.	17	300	nil	
ditto	20?		few	Peter. Supp. time buried.
ditto	15?		few	Peter. Supp. time buried.
ditto	50	150	nil	
ditto	100?		few	Peter. Supp. age in soil.
Sorghum halepense, Pers.	17	100	nil	
vulgare, Pers.	12		nil	Nobbe.
ditto			many	D. After 30 days in sea water.
ditto			nil	D. After 50 days in sea water.

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* Pharm Journ and Trans., 3rd ser., x., 1879-1880, p. 601.

	Years old.	No. of Seeds.	Per cent Germ.	
Sparganium angustifolium, Michx.	57	100	nil	
ramosum, Curt.	1		some	Guppy. After 1 yr. in sea water.
simplex, Huds.	10	250	0.0	Fischer. Kept in clear water.
ditto	10	460	0.4	Fischer. Dried 1st year, then in water.
ditto	13		many	Fischer. After treatment with dil. acid.
Spartium junceum, Linn.	50	24	nil	
Specularia hybrida, A. de C.	60	1000	nil	
pentagonia, A. de C.			nil	Berkeley. After 30 days in sea water.
Spergula arvensis, L.	fresh		99	Nobbe.
ditto	5		85	Nobbe.
ditto	11		41	Nobbe.
ditto	59	76	nil	
ditto	67	150	nil	
Spergularia media, Presl.	1	97*	98.5	Duvel.
ditto	1	97*	96	Buried in soil.
ditto	15	20	nil	A. de C.
ditto	15	20	nil	A. de C.
media, Presl., var. heterosperma.	54	200	nil	
media, Presl., var. marginata.	69	150	nil	
rubra, Presl.	12	500	37	
rubra, Presl. (brevifolia), Wall.	57	100	nil	
Spermacoce rubra, Spreng.	15	20	nil	A. de C.
verticillata, L.	15	20	nil	A. de C.
Spilanthes Acmella, Murr (Para cress).	5	100*	50	Vilmorin. Ext. limit, 7 yrs.
Spinacia oleracea, L. (Spinach).	5	100*	50	Vilmorin. Ext. limit, 7 yrs.
ditto			many	D. After 70 days in sea water.

	Years old.	No. of Seeds.	Per cent. Germ.	
ditto			few	D. After 120 days in sea water.
ditto			nil	D. After 137 days in sea water.
Spinacia oleracea, L. (Round spinach).	5	100*	50	Vilmorin. Ext. limit, 7 yrs.
oleracea, Linn.	2	10	40	Rom. Air dried.
ditto	2	10	30-40	Rom. 1 yr. in O, H, N, CO or vacuo.
ditto	2	10	10	Rom. 1 yr. in H_2S.
ditto	2	10	20-40	Rom. 1 yr. in water, ether or chloroform vapour.
Spiraea amurensis, Maxim.	12	1000	nil	
Aruncus, Linn.	43	2000	nil	
ditto	46	4000	nil	
ditto	59	2000	nil	
ditto	62	2000	nil	
canadensis, Fisch.	50	80	nil	
canescens, D. Don., var. indica, Hort.	50	130	nil	
Gieseleriana, Zabel.	50	22	nil	
inflexa, Hort.	50	54	nil	
salicifolia, Linn., var. famulata.	50	82	nil	
sorbifolia, Linn.	50	210	nil	
Spiranthes australis, Lindl.	57	1000	nil	
Sporobolus airoides, Torr.	1		nil	Duvel. If buried, died.
cryptandrus, Gray.	1		nil	Duvel. If buried, died.
ditto	1	2*	3	Duvel. Buried deeply, 13.5 per cent.
indicus, R. Br.	49	200	nil	
indicus, R. Br., var. elongatus.	57	200	nil	

	Years old.	No. of Seeds.	Per cent. Germ.	
Matrella, Nees.	55	52	nil	
Stachys annua, Linn.	15	20	nil	A. de C.
arvensis, Linn.	22	150	nil	
ditto	34	200	nil	
ditto	45?		few	Peter. Supp. time buried.
ditto	57	34	nil	
grandiflora, Benth.	40	500	nil	
libanotica, Benth.	52	75	nil	
nepetaefolia, Cav.	76		some	Becquerel.
sylvatica, Linn.	35	120	nil	
ditto	38	100	nil	
ditto	40?		few	Peter. Supp. time in soil.
ditto	50	200	nil	
ditto	300		nil	Nobbe. Old Herb.
Stachytarpheta angustifolia. Vahl.	15	20	nil	A. de C.
orubica, Vahl., var. aristata. Vahl.	15	20	nil	A. de C.
Stackhousia monogyna, Labill., var. linariifolia, A. Cunn.	37	30	nil	
spathulata, Sieber.	57	50	nil	
Statice reticulata, L.	55	110	nil	
spathulata, Desf.	15	20	nil	A. de C.
Stellaria aquatica. Scop.	53	100	nil	
graminea, Linn.	16	210	nil	
ditto	36?		few	Peter. Supp. time in soil.
ditto	41	200	nil	
ditto	50	88	nil	

	Years old.	No. of Seeds.	Per cent. Germ.	
media, Cyrill.	19	96	nil	
ditto	20?		few	Peter. Supp. time in soil.
ditto	27	140	nil	
ditto	45?		few	Peter. Supp. time buried.
ditto	50	210	nil	
ditto	67	64	nil	
ditto	100?		few	Peter. Supp. age in soil.
Stenanthera conostephioides, Sond.	57	22	nil	
Stenopetalum lineare, R. Br.	54	35	nil	
Sterculia quadrifida, R. Br.	14	30	nil	
Stevia ovata, Lag.	15	20	nil	A. de C.
Stipa aristiglumis, F. v. M.	57	46	nil	
elegantissima, Lab.	57	50	nil	
flavescns, Labill.	57	93	nil	
semibarbata, R. Br.	55	100	nil	
ditto	50	800	nil	
setacea, R. Br.	51	1000	nil	
Strongylodon lucidus, Seem.	fresh	5	20	Guppy. After 1 yr, on sea water.
Stylidium alsinoides, R. Br.	5	200	nil	
ditto, var. cordifolia.	22	1000	nil	
ditto	15	550	nil	
soboliferum, F. v. M.	50	56	nil	
Styphelia adscendens, R. Br.	57	30	nil	
Suaeda australis, Moq.	54	100	nil	Sand-p.
maritima, Dum.	55	131	nil	
ditto	15	20	nil	A. de C.

	Years old.	No. of Seeds.	Per cent. Germ.	
Subularia aquatica, L.	61	90	nil	
Sutherlandia frutescens, R. Br.	50	50	nil	
Swainsona galegifolia, R. Br.	12	12	8.3	Sw. in water.
		88	74	After 2 hr. in acid.
ditto	25	100	11	Sw. after 2 hr. in acid.
ditto	50	22	nil	
Greyana, Lindl.	50	36	nil	
Symphytum orientale, L.	50	16	nil	
Syncarpia laurifolia, Tenore.	8	200	58	Of sound, fertile seed.
ditto	10	2000	5.9	
ditto	38	250	nil	
ditto	38	250	nil	
leptopetala, F. v. M.	56	200	nil	
Synoum glandulosum, Juss.	57	12	nil	
Syringa Josikaea, Jacq.	50	22	nil	
vulgaris, Linn., var. purpurea.	50	18	nil	
vulgaris, Linn., var. rubra.	50	10	nil	
Tabernaemontana orientalis, R. Br.	10	100	nil	
ditto	47	100	nil	
Tanacetum vulgare, L. (Tansy).	2	100*	50	Vilmorin. Ext. limit, 4 yrs.
ditto	50	490	nil	
Taraxacum officinale, Weber., var, Dens-leonis, Desf.	24	30	nil	
officinale, Weber., var. erythrospermum, Andr.	1	86*	87.5	Duvel. Buried deeply, 45 per cent.
officinale, Weber. (Dandelion).	2	100*	50	Vilmorin. Ext .limit, 8 yrs.

	Years old.	No. of Seeds.	Per cent. Germ.	
officinale, Weber.	12	220	nil	
ditto	36?		few	Peter. Supp. time in soil.
ditto	50	180	nil	
ditto	57	70	nil	
ditto			many	D. After 61 days in sea water.
Tarrietia Argyrodendron, Bth.	10	35	nil	
ditto	57	20	nil	
Taxus baccata, Linn., var. fastigiata.	50	30	nil	
Tecoma australis, R. Br.	53	120	nil	All sw. in water.
ditto	55	150	nil	
Latrobei, F. v. M.	50	18	nil	
Telephium Imperati, Linn.	50	92	nil	
Templetonia egena, Benth.	9	80	2.5	
ditto	57	30	nil	All sw. in water.
retusa, Benth.	57	40	nil	
Tephrosia purpurea, Pers.	50	35	nil	
Tetragonia expansa. Murr. (New Zealand spinach).	4	100*	50	Vilmorin. Ext. limit, 8 yrs.
expansa, Murr., var. inermis.	57	12	nil	
expansa, Murr.	57	14	nil	
Teucrium Botrys, L.	57	73	nil	
Chamaedrys, L.	59	48	nil	
hircanicum, L.	15	20	nil	A. de C.
lancifolium, Boiss., var. asiaticum, Linn.	50	75	nil	
orientale, L.	15	20	nil	A. de C.

	Years old.	No. of Seeds.	Per cent. Germ.	
Scordonia, Linn.	10	150	nil	After $\frac{1}{2}$ hr. in acid.
ditto	10	250	nil	In acid 15 minutes.
ditto	10	300	nil	After 2 months moist.
ditto	10	250	nil	After 6 months moist.
ditto	55	80	nil	
sessiliflorum, Bth.	57	40	nil	
Thalia dealbata, Fras.	35?		some	Poisson. In soil.
Thalictrum angustifolium, Linn.	50	98	nil	
aquilegifolium, Linn.	15	20	nil	A. de C.
Cornuti, Linn.	67	146	nil	
flavum, Linn.	15	20	nil	A. de C.
glaucum, Desf.	50	32	nil	
ditto (densiflorum), H. B. and K.	15	20	nil	A. de C.
minus, Linn., var. elatum.	50	30	nil	
minus, Linn., var. pubescens.	50	31	nil	
Thespesia macrophylla, Blume.	35	25	nil	Sw. in water.
		45	2	Sw. after $\frac{3}{4}$ hr. in acid.
ditto	50	80	nil	Sw. after 2 hr. in acid.
Thlaspi alpestre, Linn.	15	20	nil	A. de C.
arvense, Linn.	1	57*	54	Duvel. Buried in soil, 11 per cent.
ditto	15	20	nil	A. de C.
ditto	20?		some	Peter. Supp. time in soil.
ditto	50	125	nil	
ditto	61	62	nil	
ditto	300		nil	Nobbe. Old Herb.
perfoliatum, L.	15	20	nil	A. de C.

	Years old.	No. of Seeds.	Per cent. Germ.		
Thryptomene Mitchelliana, F. v. M.	57	100	nil		
Thuya orientalis, Linn.	50	54	nil		
Thymus vulgaris, L. (French thyme).	3	100*	50	Vilmorin.	Ext. limit, 7 yrs.
Thysanotus Baueri, R. Br.	57	19	nil		
Patersoni, R. Br.	57	44	nil		
Tigridia Pavonia, Ker. Gawl.	15	20	nil	A. de C.	
Tillaea siberiana, Schult., var. verticillaris, D. C.	57	200	nil		
Tordylium cordatum, Poir.	15	20	nil	A. de C.	
Trachelium caeruleum, Linn.	50	850	nil		
Trachymene crassifolia, Benth.	54	50	nil		
heterophylla, F. v. M.	54	100	nil		
humilis, Benth.	57	37	nil		
incisa, Rudge.	50	45	nil		
lanceolata, Rudge.	57	200	nil		
pilosa, Sm.	57	34	nil		
Tragopogon crocifolius, Linn.	15	20	nil	A. de C.	
porrifolius, L.	50	35	nil		
porrifolius, L. (Salsify).	2	100*	50	Vilmorin.	Ext. limit, 8 yrs.
Tragus racemosus, Scop.	15	20	nil	A. de C.	
ditto	57	54	nil		
Trapa natans, L. (Water chesnut).	1	100*	50	Vilmorin.	Ext. limit, 2 yrs.
Tribulus terrestris, L. (acanthococcus).	57	35	nil		
Trichostema dichotomum, L.	50	50	nil		
Tricoryne elatior, R. Br.	37	20	nil		
ditto	57	90	nil		

	Years old.	No. of Seeds.	Per cent. Germ.	
elatior, R. Br., var. graminifolia, F. v. M.	55	35	nil	
Tricostularia pauciflora, Benth.	57	100	nil	
Tridax trilobata, Hemsl.			some	D. After 22 days in sea water.
Trientalis europaea, L.	57	45	nil	
ditto	57	70	nil	
Trifolium, sp. (Clover).	2	10	40	Rom. 1 year in O, CO or ether vapour.
ditto	2	10	10	Rom. Dried in air.
ditto	2	10	nil	Rom. 1 year in aqueous or chloroform vapour.
ditto	2	10	30-50	Rom. 1 year in vacuo. H or H_2S.
ditto	2	10	20	Rom. 1 year in N.
agrarium, L.	22	80	48	1 hr. in acid.
ditto	1400?		some	Brard. Seed from a Roman tomb.
alexandrinum, L.	12		nil	Nobbe.
ditto	15	20	nil	A. de C.
angustifolium, L.	49	56	nil	All sw. in water.
aristatum, Hornem.	15	20	nil	A. de C.
arvense, Linn.	15	20	nil	A. de C.
ditto	55	167	nil	All sw. in water.
		68	12	1½ hr. in acid.
ditto	67		some	Becquerel.
dubium, Sibth., var. minus.	50	200	nil	
elegans, Savi., var. caespitosum.	27		some	Becquerel.
filiforme, Linn.	19	50	32	½ hr. in acid.
fragiferum, L.	55	30	nil	All sw. in water.

	Years old.	No. of Seeds.	Per cent. Germ.	
globosum, L.	50	3	nil	
glomeratum, L.	13	100	39	All sw. after 1 hr. in acid.
ditto	17	100	2	All sw. after ½ hr. in acid.
ditto	20	100	25	All sw. after 1 hr. in acid.
ditto	53	140	nil	Sw. in water.
ditto		20	10	Sw. after 1 hr. in acid.
hybridum, L.	1	92*	84	Duvel. Of buried seed, 4.5 per cent. germ.
ditto	12		1	Nobbe.
incarnatum, Linn.	fresh		many	D. After 5 days in sea water.
ditto	fresh		some	D. After 12 days in sea water.
ditto	fresh		0.2	D. After 20 days in sea water
ditto	fresh		nil	D. After 30 days in sea water.
ditto	5	200	38	
ditto	10	200	11	After 1 hr. in acid.
ditto	12		nil	Nobbe.
ditto	42	88	nil	
ditto	50	82	nil	
ditto	55	43	nil	All sw. in water.
ditto	73	42	nil	All sw. in water.
intermedium, Guss.	70	18	nil	All sw. in water.
Lupinaster, L.	50	18	nil	
maritimum, Huds.	15	20	nil	A. de C.
ditto	59	50	nil	All sw. in water.
ditto	63	38	nil	All sw. in water.
Perreymondi, Gren. and Godr.	50	86	nil	

	Years old.	No. of Seeds.	Per cent. Germ.	
pratense, L.	1	89*	73	Duvel. Of buried seed, 4 per cent. germ.
ditto	fresh		87	Nobbe.
ditto	4		41	Nobbe.
ditto	15	20	nil	A. de C.
ditto	20	150	nil	
ditto	45?		few	Peter. Supp. time buried.
ditto	46?		few	Peter. Supp. age in soil.
ditto	50	120	nil	
pratense, L.	12		nil	Nobbe.
ditto	14	1000	4.6	2 hr. in acid. All sw.
ditto, var. expansum.	15	20	5-15	A. de C.
procumbens, L.	18?		few	Peter. Supp. age in soil.
ditto	54	50	nil	All sw. in water.
ditto, var. campestre, Sch.	300		nil	Nobbe. Old Herb.
ditto, var. minimum.	1400		some	Des Moulins. Seed from a Roman tomb.
ditto	14	100	3	
reclinatum, Wal. and Kit.	50	100	nil	
reflexum, Linn.	15	20	nil	A. de C.
repens, L.	1	85*	43	Duvel. Of buried seed, 1 per cent. germ.
ditto	fresh		50	Nobbe.
ditto	2		50	Nobbe.
ditto	12		nil	Nobbe.
ditto	14	1000	6.3	2 hr. in acid. All sw.
ditto	17	180	nil	
ditto	18?		few	Peter. Supp. age in soil.
ditto	32?		few	Peter. Supp. age in soil.

	Years old.	No. of Seeds.	Per cent. Germ.	
ditto	36?		few	Peter. Supp. age in soil.
ditto	45?		few	Peter. Supp. age in soil.
ditto	100?		few	Peter. Supp. age in soil.
rubens, L.	15	20	nil	A. de C.
scabrum, L.	55	28	nil	All sw. in water.
ditto	56	47	nil	All sw. in water.
Sebastiani, Savi.	50	96	nil	
speciosum, Willd., var. Gussoni.	15	20	nil	A. de C.
spumosum, L	15	20	nil	A. de C.
squarrosum, L.	61	100	nil	All sw. in water.
stellatum, L.	50	30	nil	All sw. in water.
ditto	54	32	nil	All sw. in water.
ditto	56	34	nil	All sw. in water.
striatum, L.	51	90	nil	All sw. in water.
strictum, Linn.	47	54	nil	Sw. in water.
ditto	47	120	11	Sw. after 1 hr. in acid.
ditto, var. laevigatum, Poir.	45	46	nil	Sw. in water.
		6	nil	Sw. after 1 hr. in acid.
subterraneum, L.	15	20	5-15	A. de C.
tomentosum, L.	50	10	nil	
tridentatum, Lindl., var. melananthum.	15	20	nil	A. de C.
Triglochin centrocarpum, Hook., var. nanum.	57	100	nil	
maritimum, L.	55	48	nil	
mucronatum, R. Br.	57	100	nil	

	Years old.	No. of Seeds.	Per cent. Germ.	
striatum, Ruiz. and Pav., var. decipiens.	55	100	nil	
Trigonella caerulea, Ser.	15	20	nil	A. de C.
ditto	50	64	nil	
Eretica, Boiss.	15	20	nil	A. de C.
Foenum-graecum, L.	12	78	5	All sw. in water.
ditto	50	23	nil	
polycerata, L.	50	35	nil	
ditto	50	130	nil	
ditto, var. pinnatifida, Cav.	50	83	nil	
spinosa, Linn.	15	20	nil	A. de C.
Triodia decumbens, Beauv.	16	120	nil	
irritans, R. Br.	57	80	nil	
procera, R. Br.	105	2000	nil	
Trisetum antarcticum, Trin.	57	200	nil	
ditto	54	62	nil	
ditto, var. muticum, F. v. M.	57	100	nil	
Tristania conferta, R. Br.	10	1000	nil	
Trithuria submersa, Hook. f.	57	120	nil	
Triticum vulgare, L. (Wheat)	fresh	100	68	1 day at 100 deg. C., dry.
ditto	1	99*	86	Duvel. Buried in soil; all died.
ditto	13	88	nil	
ditto	fresh	100	85	5 days in oxygenless water.
ditto	fresh	100	5	14 days in oxygenless water.
ditto	fresh	100	nil	21 days in oxygenless water.
ditto	fresh	100	nil	1 day in aqueous $HgCl_2$.

	Years old.	No. of Seeds.	Per cent. Germ.	
ditto	fresh	100	10	After 1 days abs. alc.
ditto	fresh	100	2	After 21 days abs. alc.
ditto	fresh	100	nil	After 35 days abs. alc.
ditto	fresh	100	95	After 5 weeks in dry H and N.
ditto			many	D. After 1 month in sea water.
ditto			some	Schröder. Des. to 2 per cent. H_2O.
ditto	fresh	100	91	Des. 28 days to 2.67 H_2O.
ditto	1	100	96	Haberlandt.
ditto	3	100	60	Haberlandt.
ditto	5	100	4	Haberlandt.
ditto	8	100	88	Haberlandt.
ditto	12	200	nil	
ditto	12	300	1.7	
ditto	16	50	8	From Ch. of Commerce, S. Australia.
ditto	17	200	nil	
ditto	51	64	nil	
ditto	71	68	nil	
ditto	100		some	Stated by Hemsley.
ditto	10		0-10	Nobbe.
ditto	30		nil	Acton.
ditto	fresh		many	D.C. Cooled 100 times to about 50 deg. C.
ditto	3		most	Rohde.
ditto	1	100	100	Burgerstein. Dry in air.
ditto	4	100	94	Burgerstein. Dry in air.
ditto	7	100	85	Burgerstein. Dry in air.
ditto	10	100	75	Burgerstein. Dry in air.

	Years old.	No. of Seeds.	Per cent. Germ.	
ditto	16		nil	Giglioli. In hydrogen.
ditto	16	50	nil	Giglioli. In H_2S.
Triumfetta annua, Linn., var. triclada.	15	20	nil	A. de C.
Tropaeolum majus, L. (Tall nasturtium).			most	D. After 37 days in sea water.
ditto			nil	D. After 50 days in sea water.
ditto	7	100	11	
ditto	50	30	nil	
ditto	5	100*	50	Vilmorin. Ext. limit, 6 yrs.
minus, L.	5	100*	50	Vilmorin. Ext. limit, 8 yrs.
pentaphyllum, Lam.	50	16	nil	
Tunica Saxifraga, Scop.	13	100	nil	
Tussilago Farfara. Linn.			few	D. After 25 days in sea water.
Tylophora barbata. R. Br.	57	32	nil	
Typha angustifolia, Linn.	57	1000	nil	
latifolia, Linn.	57	1000	nil	
ditto	ripe		nil	Coats intact. Crocker.
ditto	ripe		89	Coats broken. Crocker.
Ulex europaeus, Linn.			many	D. After 11 days in sea water.
ditto			few	D. After 14 days in sea water.
ditto			nil	D. After 28 days in sea water.
ditto	50	160	nil	
Urena lobata, Linn.	15	20	nil	A. de C.
Urospermum Dalechampii, F. Schmidt.	15	20	nil	A. de C.
Urticaceae.	25		nil	Becquerel.
Urtica incisa, Poir.	51	250	nil	
pilulifera, Linn.	15	20	nil	A. de C.
ditto	56	114	nil	

	Years old.	No. of Seeds.	Per cent. Germ.	
urens, Linn.	59	100	nil	
Utricularia tilacina, Griff.	55	50	nil	
Valerianella dentata, Pollich.	12	220	nil	
ditto	16	250	nil	
ditto	20?		few	Peter. Supp. age in soil.
ditto	36?		few	Peter. Supp. time in soil.
echinata, D. C.	50	15	nil	
eriocarpa, Desf. (Italian Cornsalad).	4	100*	50	Vilmorin.
olitoria, Pollich (Cornsalad).	5	100*	50	Vilmorin. Ext. limit, 10 yrs.
ditto	67	42	nil	
ditto (Large seeded Dutch).	5	100*	50	Vilmorin. Ext. limit, 10 yrs.
Velleia connata, F. v. M.	57	22	nil	
Verbascum Blattaria, Linn.	15	20	nil	A. de C.
ditto	57	500	nil	
phlomoides, Linn.	15	20	nil	A. de C.
pulverulentum, Vill., var. floccosum.	15	20	nil	A. de C.
virgatum, Stokes, var. blattarioides.	50	5000	nil	
Thapsus, Linn.	1	82*	98	Duvel. Buried deeply, 25.5 per cent.
ditto	15	20	nil	A. de C.
ditto	30		nil	Becquerel.
Verbenaceae.	25		nil	Becquerel.
Verbena hastata, Linn.	1	9*	5	Duvel. Buried deeply, 14 per cent.
officinalis, Linn.	10	100	nil	
ditto	15	20	nil	A. de C.

	Years old.	No. of Seeds.	Per cent Germ.	
urticifolia, Linn.	1	1.5	nil	Duvel. Buried deeply, 26.5 per cent.
ditto	15	20	nil	A. de C.
Verbesina encelioides, Benth. and Hook. f.	19	50	nil	
serrata, Cav.	15	20	nil	A. de C.
Vernonia urticaefolia, Rich.	55	32	nil	
Veronica agrestis, L.	18	160	nil	
ditto	20?		few	Peter. Supp. time in soil.
ditto	25	130	nil	
Anagallis, L.	61	250	nil	
arguta, R. Br.	57	50	nil	
arvensis, L.	20	85	nil	
ditto	20?		few	Peter. Supp. age in soil.
ditto	35?		few	Peter. Supp. age in soil.
ditto	50	120	nil	
calycina, R. Br.	57	200	nil	
didyma, Tenore., var. polita.	20?		few	Peter. Supp. time buried.
ditto	45?		few	Peter. Supp. time buried.
hederaefolia, L.	59	100	nil	
longifolia, L.	50	95	nil	
nivea, Lindl.	57	100	nil	
notabilis, F. v. M.	37	200	nil	
ditto	54	200	nil	
officinalis, L.	25	110	nil	
ditto	30	88	nil	
ditto	35?		few	Peter. Supp. age in soil.
ditto	50	140	nil	

	Years old.	No. of Seeds.	Per cent. Germ.	
ditto	60	132	nil	
ditto	100?		few	Peter. Supp. age in soil.
peregrina, L.	57	100	nil	
perfoliata, R. Br.	55	38	nil	
scutellata, L.	55	92	nil	
serpyllifolia, L.	16	45	nil	
ditto	18?		few	Peter. Supp. age in soil.
ditto	20?		few	Peter. Supp. age in soil.
ditto	35?		few	Peter. Supp. age in soil.
ditto	45?		few	Peter. Supp. time buried.
ditto	57	34	nil	
ditto	100?		some	Peter. Supp. age in soil.
Tournefortii, Gmel., var. Buxbaumii, Ten.	57	82	nil	
Viburnum dentatum, Linn.	50	18	nil	
ditto	61	72	nil	
Opulus, Linn., var. Oxycoccos.	50	15	nil	
pubescens, Pursh.	50	16	nil	
ditto, var longifolium.	50	11	nil	
Vicia angustifolia, Clos.	16	24	nil	
ditto	18?		few	Peter. Supp. age in soil.
ditto	18	40	nil	
biflora, Desf.	15	20	nil	A. de C.
bithynica, L.	64	18	nil	All sw. in water.
Ervilia, Willd.	15	20	nil	A. de C.
ditto	54	100	nil	All sw. in water.

	Years old.	No. of Seeds.	Per cen Germ.	
Faba, L. (Broad-bean).	fresh	6	33	D. After 11 days in sea water.
ditto	fresh	6	nil	D. After 22 days in sea water.
ditto	6	100*	50	Vilmorin. Ext. limit, 10 yrs.
ditto	12		nil	Nobbe.
gemella, Crantz.	46	30	nil	Sw. in water.
		26	nil	Sw. after 1 hr. in acid.
gracilis, Loisel.	45	20	nil	A. de C.
grandiflora, Scop., var. sordida.	15	20	5-15	A. de C.
hirsuta, S. F. Gray.	45	40	nil	All sw. in water.
lutea, L.	55	20	nil	
monanthos, Desf.	3		50	Vilmorin. Ext. limit, 8 yrs.
narbonensis, L.	50	15	nil	
sativa, L. (vetch).			nil	D. After 5 days in sea water.
sativa, L. (grey).	12		nil	Nobbe.
sativa, L. (white).	11		nil	Nobbe.
sativa, L. (brown).	12		14	Nobbe.
ditto	16		nil	Giglioli. In hydrogen.
sicula, Guss.	50	19	nil	
tenuifolia, Roth.	45?		few	Peter. Supp. time buried.
ditto	50	52	nil	
unijuga, A. Br.	50	10	nil	
Vigna capensis, Walp.	15	20	nil	A. de C.
Catjang, Walp.	1	82.5*	nil	Duvel. Buried in soil, 1 per cent.
ditto	96	25	nil	All sw. in water.
ditto	10	40	35	Sw. in water.
ditto (Cow Pea, black).	10	50	66	

	Years old.	No. of Seeds.	Per cent. Germ.	
ditto (Cow Pea, white).	12	50	nil	
ditto	10	50	40	Sw. in water.
ditto	9	50	70	All sw. in water.
glabra, Savi., var. niloticas, Del.	15	20	nil	A. de C.
ditto	48	8	25	Sw. in water.
		12	33	Sw. after 1 hr. in acid.
Villarsia parnassifolia, R. Br.	57	50	nil	
Viminaria denudata, Sm.	11	22	13.6	Sw. on soaking and 3 germ.
		128	80.5	Sw. after $2\frac{1}{2}$ hr. in acid, and 103 germ.
ditto	12	150	58	3 hr. in acid.
ditto	12	150	22	24 hr. in acid. 52 undissolved, of which 33 germinated.
ditto	18	68	7.3	After 2 hr. in acid.
		32	38	After addit. 2 hr. in acid.
ditto	50	33	nil	
Viola canina, L., var. montana, L.	50	108	nil	
odorata, L.	50	12	nil	
pinnata, Linn., var. dissecta.	50	42	nil	
Viscum album, L.	fresh		nil	Wiesner.
ditto	6 mths		100	Wiesner. Only germ. after winter rest.
Vitex Agnus-castus, L.	15	20	nil	A. de C.
Vitis vinifera, L.	fresh		some	Lefroy. After 1 week in sea water.
ditto	17	122	nil	
Vittadinia australis, Rich.	57	500	nil	
Waitzia corymbosa, Wendl., var. acuminata.	57	100	nil	

	Years old.	No. of Seeds.	Per cent. Germ.	
Watsonia aletroides, Ker. Gawl.	50	19	nil	
angusta, Ker. Gawl., var. fulgida.	50	14	nil	
Meriana, Mill.	50	44	nil	
ditto, var. iridifolia, Ker. Gawl.	50	15	nil	
ditto	51	15	13.3	
Westringia eremicola, Cunn.	55	50	nil	
Wiborgia obcordata, Thunb.	50	16	nil	
Wistaria Maideniana. F. M. Bailey.	10	7	43	6 hr. in acid. Cot. of another seed partly living.
Xanthima texanum, D. C.	50	6	nil	
Xanthium canadense, Mill.			some	Mart. After 93 d. fl. on sea water.
ditto, var. macrocorpum.			some	Mart. After 45 d. fl. on sea water.
pensylvanicum, Wallr.	1	50*	nil	Duvel. Buried in soil, 0.5 per cent.
spinosum, L.	57	60	nil	
Xanthostemon paradoxus, F. v. M.	51	100	nil	
Xerotes leucocephala, R. Br., var. typhina, Lindl.	47	50	nil	
sororia, F. v. M.	57	50	nil	
Zea Mays, Linn.			nil	Berkeley. After 1 month in sea water.
ditto	fresh	100	88	Des. 28 days to 2.5 per cent. H_2O.
ditto	fresh	100	80	Des. 56 days to 1.7 per cent. H_2O.
ditto	1	99.5*	99	Duvel. Buried ; all died.
ditto	1	98.5*	98.5	Duvel. Buried ; all died.
ditto	2		most	Rohde.
ditto	2	100*	50	Vilmorin. Ext. limit, 4 yrs.
ditto	1	100	96	Burgestein. Dry in air.

	Years old.	No. of Seeds.	Per cent. Germ.	
ditto	4	100	78	
ditto	4	50	48	From Hawkesbury Coll., N.S.W.
ditto	7	100	36	
ditto	10	100	2	
ditto	12		nil	Wiesner.
ditto	12		0-10	Nobbe.
Zinnia pauciflora, L., var. multiflora. L.	15	20	nil	A. de C.
Zoysia pungens, Willd.	54	200	nil	
Zygophyllum Billardierii, D. C., var. ammophilum.	57	100	nil	
glaucescens, F. v. M., var. crenatum.	57	35	nil	
glaucescens, F. v. M., var. glaucum.	57	50	nil	
iodocarpum, F. v. M.	57	50	nil	
ditto	57	15	nil	

GENERAL SUMMARY.

The records of old seeds germinating fall naturally into two groups – (1) records where the seed is supposed to have lain dormant in the soil, the latter having been undisturbed (presumably); and (2) authentic records of stored or herbarium seeds. Even as regards the latter, some of the records seem to be incorrect (viz. *Phaseolus*), the seeds possibly having been inserted at a later date or the labels misplaced. The earliest complete records are those of de Candolle (*l.c.*), who found that out of 368 seeds kept dry in air for fourteen years only 17 retained a feeble germinative power, these including 5 out of 10 species of Malvaceae, 9 out of 45 species of Leguminosae, and 1 out of 30 Labiatae. De Candolle did not specially investigate the hard seeds on the list, and hence overlooked the fact that some of them *(Acacia, Medicago* and *Trifolium)* were probably germinable when softened.

Taking these precautions in an elaborate form by removing the integuments, sterilising and soaking, and keeping in moist sterile cotton wool, Becquerel considerably extended de Candolle's list, and found that 18 out of 90 leguminous seeds, those of 2 species of *Nelumbium*, of 1 Labiate and of 1 Malvaceae remained germinable for 25 to 80 years. The oldest germinable seed obtained by Becquerel were 3 species of Leguminosae 80 years old.

The various old Herbarium records are quoted in the alphabetical list, but do not require special mention. In regard to the records of seeds supposed to have lain dormant in the soil, these appear to be quite worthless, not more than two or three per cent. being confirmed by the authentic records of de Candolle, Becquerel and myself. . It might be argued that the seed might last longer in the soil than when dried in air, but Duvel's comparisons of the germination of seeds buried in soil for a year, with the same preserved dry in air for a year, show that as a matter of fact the reverse is the case with all ordinary seeds. The only apparent exceptions appear to be with those hard seeds, which Duvel seems not to have known how to treat to induce germination.

The most complete set of soil records has been made by Peter (*l.c.*), by noting the appearance of plants in soil taken from forests of known age, without undergrowth, and in which the soil was supposed to have been undisturbed since the forest was planted. He found certain plants, mainly meadow and field weeds, continually appeared where a forest had covered meadow or field for 20 to 40 years, but mainly sylvan plants from still older forests, and hence concluded that the seeds in question had lain dormant in the soil during the life of the forest. This evidence has been accepted even in Pfeffer's Physiology, although the logic is childish in the extreme. In nearly every case, as can be seen from the lists, the seeds in question have a short duration of life, rarely exceeding five years, but they are all either small or readily dispersed by wind, or animals, thus reaching the forest land from neighbouring meadows, etc., and being covered more or less deeply by the activity of burrowing animals, ants, etc., or falling down cracks and burrows in the soil. If the matter were so simple as Peter imagines it to be, and these seeds were derived from the original vegetation prior to the forest, we should expect to find them more abundant some distance below the surface than on the latter itself. Those on the surface are more apt to germinate and decay, and Duvel has shown that the more deeply buried seeds last longer. In addition, the humus from 40 to 100 years of forestal growth would be sufficient to deeply cover the original surface. On the other hand, if the soil is continually receiving fresh supplies of seed from wind and water, or from the excrements, feet and bodies of birds and other animals, some of which seeds are buried from time to time by burrowing animals or washed down cracks, burrows or holes in the ground, we should naturally expect to find the surface richer in seeds than the deeper layers. Peter found germinable seeds down to a depth of 32 cms. (1 foot), but in only two cases were a few more seeds found at 8-16 cms. (3-6 inches) than on the surface, and the number 24 to 32 cms. deep was from 3 to 20 times less, and never greater than in the surface layer. Peter's observations are good evidence of the readiness of dispersal of certain seeds, but as evidence of their longevity are quite untrustworthy. They contain a grain of truth buried in a mass of inaccuracy. The same applies to all similar records of supposed old seed in soil or under water being germinable, from the classical case of Mummy Wheat downwards. Here and there a long-lived seed has accidentally been hit upon, but in the great majority of cases the records are incorrect.

The Conditions for Longevity.

These are partly inherent in the seed itself, and partly due to the external conditions. As regards the latter, all observations agree that fairly cool, dry, airy conditions preserve seeds best, while in the soil seeds last longer in the deeper layers than in the surface ones. Seeds with impermeable coats are less dependent on the external conditions than ordinary ones, and may resist immersal in poisons or poisonous gases for years when dry and unswollen. Such seeds are naturally also most likely to last longest in the soil.

According to Fischer, however, the seeds of *Sagittaria* and similar plants may be kept under water for several years without losing the power of germination, and although the contents of the seed are moist. This is a far more remarkable fact than the long duration of certain seeds when dry, because in the former case there is a greater tendency to chemical change, and feeble respiration probably takes place.[1]

A few seeds (Willows, etc.), are killed by air drying, and according to Poisson[2] seeds of Cacao begin to die 36 hours after drying outside the fruit. In the case of all ordinary seeds, the drier the seeds the longer they are likely to last, and this applies more especially to starchy seeds.

The chief factor in longevity is the inherent character of the seed itself. In 1894[3] I showed that seeds capable of withstanding thorough drying assume a perfectly dormant condition in which they do not respire and are not living, although they have a power of restoring life potential in them for a longer or shorter period of years. Similar conclusions were made by de Candolle, who appears to have considered that all seeds, if carefully dried and preserved, would retain an indefinitely prolonged power of germination. This is, however, incorrect, and according to Becquerel, only those seeds can preserve their vitality for long periods of time which are protected by thick coats impermeable to water and oxygen, and which have feebly oxidizable reserve materials. This is, however, only a partial truth. It is a fact that "starchy" seeds last longer than oily ones, on the whole, but reference to the lists will show that many seeds containing appreciable quantities of oil are comparatively long lived (Myrtaceae, etc.) The truth is that long-lived (macrobiotic) seeds have mainly been developed among the Leguminosae, an order characterised by its starchy reserve food materials. Many more or less endospermic Leguminous seeds (*Melilotus*, *Cassia*, *Cytisus*, *Lotus tetragonolobus*, etc.), are macrobiotic, though incapable of the same duration as the non-endospermic seeds of *Goodia* and *Acacia*.

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[1] Crocker (l.c.) has thrown considerable doubt on the correctness of Fischer's views.

[2] Bulletin de la Soc. bot. de France, 1903, t. l., p. 337.

[3] Ewart, Trans. Liverpool Biol. Soc., 1894, vol. viii., p. 234.

[4] De Candolle, Archiv. d. Sci. phys. et nat: see also Nature, 1895, p. 348.

Longevity depends not on the food materials or seed coats, but upon how long the inert proteid molecules into which the living protoplasm disintegrates when drying, retain the molecular grouping which permits of their recombination to form the active protoplasmic molecule when the seed is moistened and supplied with oxygen. Chemical changes in the food materials might hasten the irrevocable disintegration which the slow process of time brings about, and in the same secondary manner the character and structure of the integuments will be of importance. The property of longevity is an hereditary peculiarity inherent in the protoplasm of certain seeds, and developed by natural selection as an adaptation to special conditions of life. According to Acton, samples of old wheat contained more soluble matter and less water than fresh wheat, while the diastatic and proteolytic ferments present in fresh wheat had entirely disappeared. This is, however, the result rather than the cause of death, since as long as the power of reconstituting the living protoplasmic molecule is present, the power of reproducing fresh ferments is retained.

Macrobiotic seeds are all seeds which show no special adaptations for dispersal. None are wind or water borne, and although some are more or less accidentally distributed by animals,

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[1] A full investigation of this question is in progress.

adhesive seeds or fruits are conspicuously absent among them. They are, in fact, distributed in time instead of in space. Falling to the ground beneath or close to the parent plant, a few are immediately germinable, but others only after long periods of years or after special actions have been brought to bear upon them.

Although a few seeds (*Phaseolus*, *Triticum*, etc.) with readily permeable coats may retain their vitality for many years in dry air, true macrobiotic seeds, adapted for prolonged duration in the soil, are always possessed of more or less impermeable coats, and they do not swell and germinate until these coats have been softened. Hiltner[1] was the first to show that hard clover seeds swelled readily after treatment with strong sulphuric acid, and this observation was extended and confirmed by Jarzymowski,[2] who showed that after appropriate treatment with strong sulphuric acid, followed by washing and neutralization with dilute ammonia or lime water, the percentage of clover seed germinating was higher than by any other form of treatment. Bergtheil and Day[3] then found that the hardness of the seeds of *Indigofera arrecta* was due to the presence of a very thin impermeable cuticle on the surface of the seed, and that when this was eaten away by half an hour's treatment with strong sulphuric acid, or broken, the seeds swelled readily. Miss White has investigated all the hard seeds, for which I found treatment with sulphuric acid necessary to bring about germination, and has detected in practically all such cases the presence of a cuticle of variable thickness. Her results are added to this paper in the form of an appendix.

Only in very few cases are seeds which do not absorb water except after filing or special treatment, not provided with a cuticle. One exception is afforded by *Adansonia digitata*, in which the whole integument seems to be permeable to water with difficulty. In almost all other cases any scratch deep enough to penetrate the cuticle allows the seed to absorb water and swell, and frequently the cuticle then frills or peels off as a transparent membrane. Hard seeds soaked in water for a day or so and then placed in strong sulphuric acid often show the cuticle as a separate layer before it dissolves away. In a few cases the remaining integument may still delay the absorption of water, but not in the remarkable way that the cuticle does. In the case of most plants producing hard seed, a certain variable percentage of each sample will usually swell in water, and if the seeds are not perfectly ripe this applies to all of them, the cuticle being undeveloped or imperfectly developed. Such seeds perish rapidly in the soil, but in a dry herbarium may last for many years, though rarely as long as the perfectly ripe cuticularized ones, which swell only after breaking the cuticle by filing or destroying it by sulphuric acid. The importance of properly testing old hard seeds to obtain correct germination values is well shown by the following experiment. One hundred 50-year-old seeds of each of 5 Leguminous plants were placed in moist soil for 6 months in a warm house, and kept under optimal conditions for germination. None germinated, and with the usual modes of testing the samples would have been considered useless. The remaining hard undecayed seed were, however, taken up, the coats sand-papered, and the seeds placed in germination chambers, with the following results:—

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[1] Arb. aus der biol. Abt. f. Land. and Forst. wissenschaft, bd. iii., s. 30, 1902, Berlin.

[2] Inaug. Diss. Halle, 1905.

[3] Annals of Botany, vol. xxi., Jan., 1907.

——	Remaining seeds.	Number Germinating	Percentage of hard seed germinable.
Acacia armata	18	2	11
,, leprosa	7	3	43
Hardenbergia monophylla	10	5	50
Indigofera cytisoides	34	34	100
Watsonia viridifolia	6	1	17

The Treatment of Hard Seeds.—Since this is a matter of considerable practical importance, some detailed data are given of the experiments made upon it with Acacia seed.

The older idea that the impermeability of the coats was due to the presence of mineral matter is quite incorrect, as is also Jarzymowski's suggestion that it is connected with the small size of the lumina in the palisade layer of the integument. As Miss White has conclusively shown that the impermeability is bound up with the presence of a cuticular layer over the seed, the only question is as to the best mode of removing that layer.[1] Scratching, filing, and such methods always tend to damage a certain percentage of the seed, besides being tedious even with the large seeds. The removal of the seed coats opens the embryo to the attacks of injurious soil organisms and causes a pronounced fall in the percentage of seed germinating.

Boiling with water soon injuriously affects the seed, although well dried Acacia seed is remarkably resistant to heat. Thus sound two-year seed of *Acacia longifolia*, *A. decurrens*, and *A. myrtifolia*, after heating to 98-100 deg. C. for 6 hours, filing and soaking, gave percentage germinations of 42, 35 and 31 respectively, the unheated seed giving germination values of 88, 46 and 52 per cent. respectively. After 2 days at 95 to 102 deg. C., however, none of the seed germinated. In warm water swelling is very slow. Thus a sample of 500 12-year-old seed of *Acacia dealbata* was soaked in water at 30-40 deg. C. for 10 days, and then at 40-50 deg. C. for a month, the swollen seeds being picked out every few days and placed in germination chambers.

Days.	No. of seeds swollen.	Number germinating.	% of swollen seeds germ.
3	43	1	2.3
6	34	nil	6.4
10	59	6	
13	85	5	5.9
17	58	5	8.6
21	50	14	28
31	38	1	4.3
33	29	2	
42	33	3	9

The 64[2] remaining seeds swelled at once after filing, and gave a percentage germination of 7.8 per cent. Hence the earlier seeds to swell are mostly dead, then the percentage germination rises and finally falls again, possibly as the result of the prolonged high temperature, although unswollen Acacia seeds can be kept a week or more under water at 60 to 65 deg. C. without entirely losing their vitality. Similar results were obtained with *Acacia myrtifolia*, but in all cases if the seeds were merely soaked for one to two days the remaining hard seeds, after filing or treatment with sulphuric acid, always gave a higher percentage germination than those which had swollen in water previously.

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[1] In some cases soaking in warm absolute alcohol makes the coats permeable to water, especially where the cuticle is thin, probably owing to the removal of the waxy materials impregnating the cuticle. Hot water, by melting the wax in the cuticle, aids in making the cuticle permeable.

[2] Seven seeds had disappeared.

Alkali is much less effective than sulphuric acid in producing swelling without injuring the seeds. Thus of old seeds of *Acacia dealbata* soaked in water at 40 deg. C. for 2 days, 9 per cent. swelled, and of these 2.3 per cent. germinated. After soaking in 5 per cent. Na_2CO_3 for 1 day at 20 deg. C., and then 1 day at 40 deg. C. to 50 deg. C., in water, 45 per cent. swelled, and of these 5.2 per cent. germinated. After 1 minute in boiling 10 per cent. caustic soda, 28 per cent. swelled after frequent washing, and 3.4 per cent. of these germinated; while after 2 minutes in boiling potash, 78 per cent. swelled and 4.6 per cent. germinated. After 10 minutes all swelled, but none germinated. Longer treatment with cold caustic soda also produces swelling, but the difficulty of causing all the seeds to swell without injuring all or most of them is equally great. Ammonia is less effective than caustic soda or potash.

The 10 per cent. caustic soda or potash is useful, however, for seed testing. Thus, if an old sample of seed of *Acacia dealbata* is boiled for 2 minutes in the solution, washed well and soaked in water at 40-50 deg. C. for 3 hours or so, all unfilled, perforated or broken, seeds, and most dead seeds, swell up partially or entirely, and exude a dark brown dye. All, or the great majority of the sound seeds are still hard and unswollen. The test is not perfect, but will distinguish a good from a bad sample of Acacia seed.

The sulphuric acid treatment has this advantage, that the concentrated acid only penetrates slowly even after the cuticle has been dissolved away, and with careful treatment the whole of the subjacent layers are left intact. Further, it sterilizes the seeds and destroys all adherent spores. In addition germination is usually hastened as compared with seeds which have swelled without treatment. The chief danger lies in allowing traces of acid to adhere to the seed, which is easily avoided by thorough washing, followed by treatment with dilute ammonia or lime water, and repeated washing. If then dried the seeds, whether Acacia, Clover, Broom, Gorse, or the like, are ready for planting and immediate germination. If the washing and drying are rapidly done the seeds do not swell, and will keep fairly well, whereas seeds softened by hot water must be planted at once. In dilute sulphuric acid the uncuticularized seeds soon lose the power of germination, and the cuticularized ones remain unsoftened. Hence the acid must only be applied to dry seeds.

The length of treatment with acid depends upon the extent to which the cuticle is developed, and as this varies in different samples of seed from the same plant, sample tests should be made before treatment, and the acid only used when the percentage of hard seeds is considerable. General data for different seeds are given in the main list, but a few detailed data for samples of very hard seed are given here, the usual washing and soaking in water following treatment with acid:—

Acacia dealbata.

Cold water		8 p. c. swelled in 2 days.
In acid,	5 minutes	10 ,, ,, ,, ,, in water.
,,	25 ,,	22 ,, ,, ,, ,, ,,
,,	2 hours	45 ,, ,, ,, ,, ,,
,,	3 ,,	66 ,, ,, ,, ,, ,,
,,	4 ,,	75 ,, ,, ,, ,, ,, 70 p. c. germinated.
,,	6 ,,	92 p. c. swelled in 2 days in water, 72 p. c. germinated.

After 6 hours some of the integuments were eaten right through, and the embryo exposed on washing, but such seeds may still be capable of germination in a germination chamber, though few would survive in the soil.

Similar results were obtained with samples of old very hard seed of *A. longifolia* and *A. decurrens.* For the smaller seeded Acacias, such as *Acacia montana*, *A. leprosa*, etc., 1 to 3 hours, and for such forms as *A. verniciflua*, 2 to 4 hours in sulphuric acid is sufficient at 15 to 20 deg. C. to produce an optimal action on germination. As the temperature rises the action of the acid is more rapid; at 30 deg. C. it is about twice as active as at 20 deg. C. The acid must be concentrated. Slight dilution lessens the action greatly, and renders it more dangerous. During the longer soaking in somewhat diluted acid, the seeds are able to absorb the acid as the coats are acted on, whereas the strong acid keeps them dry and unswollen, and only such surfaces as the acid actually touches are corroded and destroyed.

Biologic Value of Hard Seeds.—As already mentioned, such seeds distribute themselves in time rather than in space, of each year's crop some being destined to remain germinable in the soil for very many years until the parent plants have been cleared off by fire or drought. In the case of *Callistemon rigida* and similar plants the seed is largely retained on the parent plant until fire or drought causes the death of the parent plant and the shedding of the seed, which may only take place when some at least of the seeds are 10 or 20 years old. In *Acacia*, *Viminaria denudata*, *Goodia lotifolia* and the like, the seed are shed, but lie in the soil. To some extent these macrobiotic seeds are adaptations to bush fires, which were probably of common occurrence long before the advent of civilised or even uncivilised man, and must have been far more frequent than at present when the lava was flowing from the volcanoes of Victoria.

Such bush fires, after burning off the humus more or less, not only partly expose the seeds, but leave behind an alkaline ash, which the next rain falling on the warm ground aids in softening the coats of the hard seeds, and bringing about their germination. When the ash is abundant and very alkaline the seedlings may be killed, but some will always survive. In addition, slight charring of the surface of the seed makes it permeable to water without necessarily destroying the vitality of the contents. The Acacias or other Leguminous plants, by the aid of their root-nodules, can grow in soil from which all, or nearly all, the humus has been burnt away, and the source of nitrates hence removed. They steadily enrich the soil again, and produce the conditions for the growth of large forest trees. These, if destroyed by a devastating bush fire, may once more be replaced by the humus forming Acacias, etc., whose seeds have lain dormant in the soil during part, at least, of the growth of the forest.

I have, in fact, found Acacia seeds deeply buried in the soil of Gum forests, where no other signs of their presence could be seen, and where no other Acacias were present within at least a mile. In addition, the following data may be given of the number of germinable Acacia seeds per 2-inch cube of soil found at various depths under old Acacias growing in undisturbed primeval bush.

———	Depth.	Seeds present in eight cub. inches.	Number germinable	Per cent.
Acacia dealbata	3 in.	28	26	93
	6 ,,	17	13	77
	9 ,,	16	10	63
	12 ,,	11	9	82
	18 ,,	3	3	100
A. stricta	4 ,,	1	1	100
	8 ,,	2	2	100
	12 ,,	0	0	0
A. leprosa	6 ,,	28	24	86
	12 ,,	15	14	93
A. melanoxylon	4 ,,	11	10	91
	8 ,,	5	4	80
	12 ,,	2	2	100
A. longifolia	6 ,,	2	2	100
var. *mucronata*	16 ,,	0	0	0
A. verticillata	4 ,,	32	26	81
	8 ,,	5	4	80
	12 ,,	4	4	100

A square pole of such soil would in the top 18 inches, in some cases, contain sufficient germinable seed to stock several square miles of territory, so that the amount of margin allowed for accident is very great, and even a very low percentage germination would suffice to re-cover the soil with the original vegetation after the severest bush fire. The percentage germinations are high, because as soon as the seed becomes permeable in the course of time and swells, it either germinates or dies, so that in the deeper layers the only seeds found are likely to be hard macrobiotic ones. In fact, all the seeds found in the soil below the surface needed treatment with sulphuric acid to produce swelling and germination. Once they are swollen, the seeds are incapable of remaining long living in a latent condition without germinating, and this applies generally to the seeds of Leguminosae, whether cuticularized or not.

Conditions for Germination.—In addition to the usual statement that water, oxygen, and a certain temperature are needed, the proviso is required that the water and oxygen must be able to penetrate the seed in sufficient quantity. Even when a seed has absorbed water and swollen, it may remain dormant for a long time without dying if the supply of oxygen is deficient or the temperature low. Nobbe[1] and others have shown that the moist seeds of *Cirsium arvense*, *Papaver Rhoeas*, Cherry, Oak, etc., may remain alive without germinating for a year or more in the soil. Fischer[2] states that the same is the case with many water plants whose seed may remain germinable under water for years, though fully soaked. He finds that the seeds of *Sagittaria sagittifolia*, *S. platyphylla*, *Sparganium ramosum*, *S. simplex*, *Alisma Plantago*, *Potamogeton natans*, *lucens* and *pectinatus*, *Hippuris vulgaris*, *Polygonum amphibium*, *Scirpus lacustris* and *maritimus* germinate little, or not at all, in pure water, but readily if the water is allowed to foul and become sour, or if the seeds are acted upon by dilute acid or alkali (H and HO ions), especially at high temperatures. Thus after 2 hours in 0.3 mol. solution of acid at 40 deg. C., 75 per cent. germinated, whereas after 2 hours at 4-6 deg. C. only 3.4 per cent. germinated at the same subsequent temperature (25-27 deg. C.). Fischer considers that as the seed coat is permeable to water, salts and acid, the action must be a stimulating one exercised on the protoplasm of the seed by the hydrogen and hydroxyl ions. If so, the action might be suppressed by subsequent treatment with equivalent alkali after the acid. This is not the case. The treatment very possibly increases the permeability of the seed-coat to oxygen or water, and hence provides the requisite stimulus to germination. This explanation will suffice for all

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[1] Landw., Versuchsst, xx., p. 76.

[2] Ber. d. D. Bot Ges., 1907, bd. xxv., p. 108

Fischer's results, and at any rate seeds of *Sagittaria* lightly sandpapered, and then kept at 28 deg. C. to 30 deg. C., between well-wetted filter paper, germinate readily. Since the above was written, Crocker (Bot. Gaz. 1907, p. 374) has shown that the difficulty of germinating the ripe seeds of various water plants is due not to any inherent dormancy of the protoplasm, but to the coats being imperfectly permeable, the seeds germinating readily when the coats are filed or broken. Fischer's treatment, i.e., the stimulation of H and HO ions, may perhaps enable the seed to germinate under the stimulus of a lower partial pressure of O and a lower temperature than otherwise, but is not an essential condition for germination, which, given a free supply of oxygen and a sufficient temperature and supply of moisture, appears to be readily induced in the case of *Sagittaria* at least. Correvon,[1] of Geneva, states that chemical stimuli, such as soaking in 0.25 per cent. acetic acid or 2 per cent. phosphoric acid is necessary for the germination of the seeds of *Juniperus Cedrus*, but all such actions may be the result of a change in the permeability of the coverings of the seed.

It must be remembered that in some cases at least seeds permeable to water are covered before germination by continuous semipermeable membranes, and such membranes may prevent the entry of the requisite amount of oxygen, while allowing water to enter. Thus A. J. Brown[2] has shown that the inner part of the intact spermoderm of *Hordeum*, *Avena*, *Triticum* and *Secale* forms a semi-permeable membrane which allows water and iodine to enter, but not solutions of sulphuric acid up to 36 per cent. strength, or of hydrochloric acid or metallic salts up to 5 per cent. (1 per cent. nitric acid penetrated slowly), and even after boiling the seeds or treating them with iodine, the sulphuric acid may still be unable to penetrate. Hence the semi-permeable membrane is in this case a non-vital one, and it appears to be that part of the spermoderm which is derived from the epidermis of the nucellus. It may, in fact, be something of the nature of an internal cuticle.

In the case of the paired burrs of *Xanthium*, one seed usually germinates in the first year, the second in the next year, or sometimes not till a year or two later. Crocker[1] considers that this is due to the greater impermeability of the seed coat of the later seed to oxygen. It is thicker than that of the earlier seed, and also more impermeable to water, though not sufficiently so to prevent its becoming fully saturated after a day's soaking. The double effect can be overcome by a temperature over 30 deg. C., which brings about partial anaerobic respiration, and by favouring the absorption of oxygen hastens germination. The minimum temperature for the germination of the naked seeds is 18 deg. C.

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[1] Gard. Chron., 1907.
[2] Annals of Botany, vol. xxi., 1907, p. 79.

Crocker has, however, overlooked the fact that both the early and late seeds of *Xanthium echinatum* will germinate at 20 to 25 deg. C. if the temperature is maintained for 14 to 21 or more days, instead of for 8 or 9 days. Hence the temperature minimum for the germination of the later seeds is not as high as Crocker states (32-34 deg. C.). Further, if the burrs are heated to 40 deg. C. for a day, or to 50 deg. C. for a few hours while soaking, a variable percentage of the later seeds will germinate within 10 days. Hence the action of the intact integument is merely to delay and not to prevent the germination of the later seed at or near the minimum temperature for the earlier of each pair of seeds in the burr.

According to Crocker, Xanthium seed kept dry for 1 year, and still more if kept in soil, germinates more slowly at 18-22 deg. C. with the coats removed than do fresh burrs. This certainly does not apply generally, since in very many old seeds there is no perceptible delay in germination if the seeds are soaked and kept at the right temperature.

Light.—That in practice various small seeds must be superficially sown to germinate well, and that this is directly or indirectly due to their exposure to light is well known; but whether there are any seeds which, whatever the other conditions may be, will not germinate unless exposed to light, is uncertain.[2] Seeds of *Viscum album* apparently only germinate when exposed to light (Wiesner), and the same applies to the seeds of Tobacco, according to Raciborski, and to those of *Poa pratensis* and *Apium graveolens* when fresh, according to Kinzel,[3] whereas when older these seeds will germinate in darkness. On the other hand, certain seeds, such as those of *Nigella sativa, N. damascena, Allium* and *Asphodelus* were found by Kinzel to refused to germinate when exposed to strong light, and appeared to permanently lose their vitality if the exposure was prolonged. Further, if these seeds were exposed to one day's gaslight after being 1 day moist in darkness, their germination was stopped, and could only be reawakened by treatment with proteolytic enzymes after drying and re-moistening, aided by aeration and high temperatures. Kinzel followed Acton's conclusion that the loss of the power of germination was due to the destruction of the enzymes contained in the seed, but the evidence is not such as to warrant this conclusion, and the observation that treatment with enzymes may increase the percentage germination of certain old seeds[1] may be the result of error or of an action on the seed coats. Jodin,[2] in fact, denied that light affected either the vitality or the germination of seeds, whereas Laurent[3] concluded that it retarded germination and injured the vitality of resting seeds.

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[1] Bot. Gazette, 1906, p. 273.

[2] For lit. see Pfeffer's Physiol., Eng. Ed., vol. ii., p. 82.

[3] Kinzel, Ber. d. D. Bot. Ges., 1907, bd. xxv., p. 269.

Delayed Germination and After Ripening.—According to Wiesner,[4] seeds of Viscum are ripe in autumn, but will only germinate the following spring. There is no visible change in the seed, but Wiesner supposes that during this time a production of ferment takes place which prepares the way for germination. Goebel[5] mentions that certain early flowering plants have seeds which contain immature embryoes. These slowly enlarge and ripen during summer, and are ready to germinate or to complete germination in the following spring. This applies to the seeds of *Eranthis hyemalis, Ranunculus Ficaria, Anemone Corydalis,* and possibly also *Stylidium, Gagea* and *Erythronium.* These seeds apparently have no resting period, but mature slowly up to the time of germination.

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[1] Thompson, Garten flora 45, 344, 1896; Waugh, Ann. Rpt. Vt. Agr. Exp. St. 1896-7;. Science, iv., s. 6, 950, 1897: Sharpe, Mess. Hatch. Exp. St., 1901, p. 74. See also Albo Archiv. Sci. Phy. et nat., 25, 1908, p. 45.

[2] Compt. rend., t. cxxxv., p. 1229. See also Tamme, Landw. Jahrb., 1900, bd. xxix., p. 467.

[3] Compt. rend. t. cxxxv., pp. 1091, 1293.

[4] Biol. de Fflanzen, 1902, p. 55.

[5] Organography, ii., p. 249, 1905.

Nobbe and Hanlein[1] found that a large number of seeds, although soaked, only germinated after long intervals of time (3 years in some cases), and considers that this is due to some change taking place slowly in the embryo during rest. The delay was, however, merely due to the low temperature. All the seeds in the list, when soaked, provided with oxygen and kept at 25-30 deg. C., begin to germinate in 1-30 days after absorbing water. Further, it is impossible to keep any of these seeds at a suitable germination temperature (20-30 deg. C.) without their decaying long before 3 years have elapsed. Even if they are frequently washed, which does not appear to have been done by the authors, in nearly all cases signs of decay can be seen within a month of soaking if the temperature is above 20 deg. C., and usually before this. The fact that Nobbe and Hanlein found 9 out of 31 seeds gave germination percentages of nil or below 1 per cent. is sufficient to show that they did not work under proper conditions, for the plants mentioned are freely seeding ones, and two of them, *Verbascum nigrum* and *Plantago major*, gave percentages of 42 and 64 per cent. within 3 weeks on germinating soaked seed at 25-30 deg. C.

Nobbe and Hanlein found that seeds of *Chenopodium album* and *Chelidonium majus* mostly remained in the soil for 1 year, and some for 3 years before germinating. Here, again, all properly soaked seeds kept at 25-30 deg. C. and freely aerated, germinate within a month, and by that time all the dead soaked seeds are distinctly decayed.

Various observers have stated that seeds of *Cucurbita* and *Allium* germinate more readily and abundantly after keeping a year or more, or warming for a time, than when fresh. This certainly does not apply to all samples of seed, and hence it is not easy to say whether we are dealing with a manifestation of after ripening, or with some changes in the character of the seed coats. In some of the seeds examined by Duvel the fresh seed gave a lower percentage germination than the same seed examined a year later; but this may have been due to imperfect methods. Such results as those for *Lactuca Scariola*, for instance, are obviously inaccurate, and in many cases Duvel gives widely different percentages for the same seeds according to whether they were germinated in a green-house or in a control chamber, the percentages being sometimes much higher and sometimes much lower in the latter case than in the former. This can only be due to inaccurate work, and the same explanation possibly applies to the fact that the year-old air-dried seeds, and in some cases the buried ones, gave higher percentages than the same seeds when originally tested. Duvel took no precautions to meet the case of hard, non-swelling seeds, and in some cases at least the seeds in question were ones with hard or more or less cuticularized coats. The weathering, softening, or abrasion of the seed coats (or fruit-walls) by rendering them more permeable to water and oxygen, might easily cause a higher percentage germination of the older seed. This is, however, not a true case of after-ripening, which is strictly a vital process taking place in the living contents of the seed. In other cases where seeds are supposed only to germinate after being dried, the drying appears to act by causing cracks to appear in an otherwise impermeable integument. Crocker (*l.c.*) has, in fact, shown that several cases of delayed germination supposed to be due to after-ripening are really due to the impermeable properties of the seed coats. Thus *Ascyris amaranthoides* has dimorphic seeds, consisting of (a) flattened winged forms with permeable coats, which germinate readily, and (b) rounded forms with impermeable coats, which germinate only after considerable delay unless the seed coats are broken. In the case of *Abutilon Avicenniae* and *Chenopodium album*, the seed coats of otherwise similar seeds are unequally permeable, some swell at once, others only after prolonged soaking. The same is the case with the seeds of the Leguminosae in the foregoing lists. The "hard" seeds are usually smaller than the readily swelling ones, but this is simply because they are drier; when swollen the sizes are approximately the same, and in the act of swelling many of the "hard" Acacia seeds often increase by 2 to 4 times the original bulk.

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[1] Landw., Versuchsst, 1877, p. 63, 1880, p. 465.

In the case of *Plantago major*, *P. Ruegelii*, *Thlaspi arvense* and *Avena fatua*, the delay in germination is also due to the seed coats, and can be overcome by removing or breaking them. When they are intact the minimum temperature for the germination of the first 3 seeds is above 22 deg. C., which would explain Nobbe and Hanlein's results with these seeds. The seeds of Hawthorn are supposed not to germinate until after a year in the soil. Crocker obtained no definite confirmation or negation of this fact, but here also it appears to be a case of the slow disintegration of the seed coats.

The Condition of Resting Seeds.—The old idea that the complete suppression of every form of vital activity necessarily involved irrevocable death, led to the assumption that in resting seeds respiration continued, though at a very low ebb. Jodin[1] showed, however, that 20 peas containing as much as 11 per cent. of water, and linseed containing 12 per cent., produced a mere trace of carbon dioxide in four years. Kolkwitz[2] has recently shown in the case of Barley how rapidly the amount produced decreases as the percentage of moisture decreases.

Barley.—

Weight of seed.	Temperature.	Percentage of water.	CO_2 produced per 24 hours.
1 Kilogram	Summer	19-20 p. c.	3.59 mg.
,,	,,	14-15 ,,	1.4 ,,
,,	,,	10-12 ,,	.35 ,,
,,	50 deg. C.	10-12 ,,	15.0 ,,

Becquerel[3] finds that air-dried seeds give off small traces of carbon dioxide, and absorb traces of oxygen. Exposure to light increases this action, and the gaseous exchanges from the integuments of *Ricinus* are greater than from the seed from which they have been removed. Obviously here we are dealing with extraneous chemical oxidations not connected with vitality. In fact, the drier the seed the less the "respiration," and in seeds capable of withstanding extreme desiccation the absence of moisture entirely prevents all gaseous exchanges. A priori this must be the case in all dry seeds covered with a continuous impermeable cuticular layer. Thus no perceptible evolution of carbon dioxide could be detected from clean dry samples of Acacia seed containing less than 5 to 8 per cent. of water

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[1] Compt. rend. d. l'Acad. des Sciences, t. 122, p. 1349, 1896.

[2] Ber. d. D Bot. Ges., 1901, vol. xix., p. 285.

[3] Comptes rendus, t. cxliii., 1906, p. 974.

(*A. dealbata, longifolia*). Such seeds when preserved in a dry atmosphere seem to steadily lose water until ultimately as dry as if kept in a desiccator. It is as though the cuticle allowed traces of water to escape externally, but none to enter. Thus fresh air-dried Acacia seed contained 5 to 14 per cent. of moisture, whereas 10 to 20-year-old seed of *A. myrtifolia*, *A. longifolia*, *A. armata* and *A. dealbata* contained only from 0.9 to 3.2 per cent., and 50-year-old seed of *A. myrtifolia* and *A. longifolia*, after heating to 100 deg. C. for half an hour to drive off adherent moisture, lost no further weight after 3 days at 100 deg. C., and only 0.7 per cent. after 1 day at 110 deg. C. Fine capillary glass tubes show a greater loss of weight than this, owing to the adherence of condensed moisture, more especially to their internal surfaces. Hence old dry cuticularized macrobiotic seeds become drier than corresponding inorganic material. However dry the seeds may be, they cannot indefinitely prolong their vitality. Even the most resistant seeds after 50 to 100 years show a pronounced decrease in the percentage germination, and the general trend of the curves is such as to show that the probable extreme duration of vitality for any known seed may be set between 150 and 250 years (Leguminosae). Probably the maximal duration for Malvaceae and Nympheaceae lies between 50 and 150 years, while for Myrtaceae and the orders containing only one or two macrobiotic seeds it is doubtful whether the limit appreciably exceeds 50 years. Even when perfectly inert a macrobiotic seed is subject to slow and gradual molecular changes and rearrangements, such as take place in glass or wood in the progress of centuries, and these changes cannot take place in the contents of the seed without destroying the molecular arrangements and groupings requisite for the restoration of life Once this has taken place no ferment, no physical or chemical condition can bring about germination.

General Summary of Tabulated Results.—For purposes of convenience we may divide seeds into 3 biological classes, according to their duration of life under optimal conditions. These are short lived or MICROBIOTIC seeds whose duration does not exceed 3 years, MESOBIOTIC seeds which may last 3 to 15 years, and MACROBIOTIC seeds which may last from 15 to over 100 years. The first two are the more numerous groups, and the boundary between them is somewhat ill-defined. Occasionally seeds such as wheat or barley, which are really mesobiotic, may come close to, or even under special conditions pass the limit of, 15 years, but since they are usually dead by this time they come properly under the head of mesobiotic seeds. The macrobiotic seeds are less numerous, are characterised by cuticularised or more or less impermeable seed coats, and are restricted to a few natural orders, of which the Leguminosae greatly surpass all others while Malvaceae and Myrtaceae come next in importance. Here again a few seeds come into this class which, under natural conditions, do not belong to it, since only seeds which have impermeable coats can survive for long periods of time in the soil.

MACROBIOTIC SEEDS.

Leguminosae.

Acacia acinacea
    alata
    aneura
    armata
    bossiaeoides
    brachybotrya
    calamifolia
    cornigera
    dealbata
    decurrens
    diffusa
    Doratoxylon
    elata
    farnesiana
    glaucescens
    lanata
    lanigera
    leprosa
    longifolia
    melanoxylon
    montana
    myrtifolia
    neriifolia
    nervosa
    penninervis
    pentadenia
    saligna
    Simsii
    suaveolens
    verniciflua
Albizzia lophantha
Alhagi camelorum
Astragalus Antiselli
    brachyceras
    glycyphylloides
Bossiaea heterophylla
Caesalpinia Bonducella
Canavalia ensiformis
    obtusifolius
Cassia australis
    bicapsularis
    Brewsterii

- laevigata
- pleurocarpa
- Sophera
- Cicer arietinum
- Coronilla Mitchelli
  - laburnifolia
  - ramosissima
  - vitellina
- Cytisus albus
  - austriacus
  - biflorus
  - candicans
  - triflorus
- Daviesia cordata
  - corymbosa
  - crenulata
- Desmanthus brachylobus
- Dillwynia ericifolia
  - floribunda
- (?) Dioclea parviflora
- Dolichos funarius
- Erythrina indica
  - Vespertilio
- Eutaxia orientalis
- Galega orientalis
- Genista anglica
  - Spachiana
- Gompholobium latifolium
  - minus
- Goodia lotifolia
- Hardenbergia monophylla
- Hovea heterophylla
  - linearis
  - longifolia
- Indigofera australis
  - cytisoides
  - signata
- Jacksonia spinosa
  - thesioides
- Kennedya monophylla
  - prostrata
  - rubicunda
- Lens esculenta
- Leucaena leucocephala
  - pulverulenta
- Lotus corniculatus
  - tetragonolobus
- Medicago denticulata
  - lupulina
  - sativa
  - scutellata
  - truncatula
- Melilotus alba
  - Bonplandi
  - gracilis
  - messaniensis
  - officinalis
  - parviflora
- Mimosa asperata
  - distachya
  - glomerata
  - pudica
- Mirbelia oxyloboides
  - reticulata
- Oxylobium Callistachys
  - cuneatum
  - ellipticum
  - lineare
  - parviflorum
  - trilobatum
- Phaseolus Mungo
  - pilosus
- Phylacium bracteosum
- Pithecolobium pruinosum
- Podalyria calyptrata
  - sericea
- Psoralea pinnata
- Pultenaea baeckeoides

- daphnoides
- retusa
- stipularis
- villosa
- Rhynchosia minima
- Swainsona galegifolia
- Trifolium agrarium
  - arvense
  - elegans
  - filiforme
  - glomeratum
  - pratense
  - strictum
  - subterraneum
- Vicia grandiflora
- Vigna glabra
- Viminaria denudata

Malvaceae.

- Abutilon Avicennae
  - (?) indicum
  - (?) Mitchelli
  - oxycarpum
- Gossypium Sturtii
- Hibiscus heterophyllus
  - panduraeformis
  - Trionum
- Kitaibelia vitifolia
- Lavatera arborea
  - cretica
  - plebeia
- Malva rotundifolia
- Malvastrum vitifolium
- Modiola multifida

Myrtaceae.

- Callistemon lanceolatus
  - rigidus
- Eucalyptus calophylla
  - cornuta
  - diversicolor
  - globulus
  - goniocalyx
  - leptopoda
  - miniata
  - obcordata
  - punctata
  - rostrata
  - tereticornis
- Leptospermum scoparium

Nymphaeaceae.

- Nelumbium luteum
  - speciosum
- Nymphaea gigantea

Labiatae.

- Nepeta botryoides
- Stachys nepetifolia
- Nepeta Cataria

Irideae.

- Iris sp.
- Watsonia Meriana

EUPHORBIACEAE.	POLYGONACEAE.
Euphorbia Peplus	Emex spinosa
GERANIACEAE.	STERCULIACEAE.
Impatiens Balsamina.	Hermannia angularis.
GOODENIACEAE.	TILIACEAE.
Scaevola Hookeri.	Entelia arborescens.

APPENDIX.

The Occurrence of an Impermeable Cuticle on the Exterior of Certain Seeds.

BY JEAN WHITE, M.SC.

(Government Research Scholar).

Whenever possible, Professor Ewart passed on to me specimens of those seeds which he found needed special treatment before they were capable of imbibing water, and consequently swelling. For the investigation of the cause of this impermeability a method was adopted which was somewhat similar to that employed by Bergtheil and Day in their researches on the hardness of the seeds of *Indigofera arrecta*.[1] The great majority of the seeds which exhibited this resistance were from plants belonging to the family *Leguminosae*. In several of the *Malvaceae*, the same phenomenon was observed, and also in a somewhat doubtful case of a species of *Chenopodium*.

Method of Experimenting.—The seeds were soaked in water for a time, varying from one to seven days.

In the majority of cases none of the seeds swelled, though commonly a small proportion did so, and in a very few instances, practically all swelled, so that it was quite difficult to obtain unswelled specimens for investigation. The unswelled seeds were removed from the water, and hand sections were cut of the seed-coat. These sections were stained on the slide with chlor-zinc-Iodine, and the stain, after remaining for one to two minutes, was washed off with glycerine water. Examination of the sections showed that in every instance, almost without exception, a structureless cuticle was observable on the exterior of the seed coat. The cuticle was clear and well defined, becoming stained bright yellow, while the cell-walls of the subjacent palisade tissue assumed the characteristic violet or bluish tint of cellulose. The internal contents of these cells were, like the cuticle, stained yellow. In nearly all cases sections were also prepared from the swelled specimens, disclosing the fact that in some no cuticle at all was developed, presumably due to the immature condition of the seeds; whilst in others the cuticle appeared to be well developed, indicating that the seed had been injured and the cuticle broken at some point or points, rendering it permeable at that point or points.

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[1] Annals of Botany, vol. xxi., Jan., 1907.

In every instance the cuticle was easily distinguishable when stained with chlor-zinc-iodine, but Bergtheil and Day were unable to discern the cuticle in the seeds of *Indigofera arrecta* when using this reagent, and in order to render the cuticle visible they employed a solution of Iodine in Phosphoric acid. Following on their method, I made up some of this stain, but though the results were always satisfactory, in no instance was the differentiation so complete as when chlor-zinc-iodine was used. This suggested the possibility that the chlor-zinc-iodine solution used by Bergtheil and Day might not be of the correct consistence, and I obtained seeds of *Indigofera arrecta* in order to test them with my solution. I found that I obtained the same results as when the other seeds were used, so that it was evident that the chlor-zinc-Iodine solution used by Bergtheil and Day was at fault. A distinct cuticle was present in the *Indigofera arrecta*, whilst there was no trace of a cuticle structure in the sections of *Indigofera sumatrana*, treated with chlor-zinc-iodine solution.

In some of the seeds examined, notably those of *Labichea lanceolata*, the whole of the structureless cuticle did not appear to be specially resistent, but there was a narrow edge on the free side of the cuticle which stained a deeper yellow, and which on treatment with strong sulphuric acid, disintegrated into segments. It appeared to be in this edge that the extreme impermeability of the seed coat was located.

The variations in the resisting powers of the different seeds are very curious, and as will be noticed in the accompanying tables, the thickness of the cuticle does not seem to be solely responsible in determining the powers of resistance to swelling. Naturally the quality and degree of impregnation of the cuticle is as important as its thickness. As an example of this a few cases of different species of Acacia may be cited.

Thus the thickness of the cuticular layer of *Acacia diffusa*, as measured by the eyepiece micrometer was .042 mm., whilst that of *Acacia glaucescens* was .022 mm. In the former case soaking for 0.5 hours in acid was sufficient to produce swelling of the seeds when put into water; but in the latter case none of the seeds swelled in water unless they had been previously soaked in sulphuric acid for 1.5 hours.

As a general rule in small and medium-sized seeds, the cuticle is well developed, and represents the impermeable part of the seed coat, while in the case of large seeds, such as those of *Adansonia Gregorii*, *Mucuna gigantea*, *Wistaria Maideniana* and *Guilandina Bonducella*, the cuticle is relatively unimportant and inconspicuous. In these seeds the extreme resistance which they exhibit appears to be located in the palisade cells. The above conclusions were arrived at as a result of further experiments which were carried out with the seeds.

The unswelled seeds, after several days' soaking in water, were placed in strong sulphuric acid and left there for about 15 minutes. They were removed, and again placed in water, in which they remained for a day. Immersion for 15 minutes in nearly every case proved to be insufficient to render them permeable, and consequently they were replaced in the sulphuric acid for 10 or 15 minutes again. Half an hour's immersion in the acid was found to be adequate for most of the seeds, there being a small minority which required further soaking in acid for 15 to 60 minutes longer. The minimum times required for the different varieties of seeds to be soaked in acid before they are capable of imbibing water are stated in the accompanying tables. Directly a seed was seen to have swelled in water, a section of the seed coat was cut, with the result that in the majority of smaller seeds the palisade layer was observed to be quite intact, whilst the cuticle had been in some cases wholly, but in the greater number of cases partially, dissolved away by the acid.

But it was different with the larger seeds; for sections of the seed coat cut after swelling showed that the palisade tissue was eaten away by the acid, and ordinarily it was practically all gone.

Before and during swelling, almost without exception, a membrane peeled off the seeds, which in the smaller seeds appeared to be the cuticular layer only, and in the larger consisted of the palisade cells and the very inconspicuous cuticle.

The most resistent seed of all those which I tried was that of *Adansonia Gregorii.* Professor Ewart found that his specimens swelled after 6 hours soaking in sulphuric acid, but in the case of a different sample with which I experimented, immersion in acid for that period of time produced no perceptible effect whatever.

The actual results of my experiments have been put down in a tabular form, and the accompanying figures represent sketches of the sections of the seed coats of one species of each genus of most of the seeds used.

Name of Seed.	*Minimum time in sulphuric acid to produce swelling.	Thickness of cuticle.
Abutilon oxycarpum	.5 hours	.030 mm.
Acacia brachybotrya	.42 ,,	.019 ,,
Acacia calamifolia	1 ,,	.060 ,,
Acacia diffusa	.5 ,,	.042 ,,
Acacia glaucescens	1.5 ,,	.022 ,,
Acacia iteaphylla	.5 ,,	.005 ,,
Acacia leprosa	.5 ,,	.015 ,,
Acacia longifolia	1 ,,	.030 ,,
Acacia montana	.42 ,,	.015 ,,
Acacia myrtifolia	1 ,,	.019 ,,
Acacia penninervis	.75 ,,	.030 ,,
Acacia retinodes	1 ,,	.018 ,,
Acacia verniciflua	.42 ,,	.016 ,,

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* In practically all cases the time of immersion can be doubled or more than trebled without appreciable injury to the seed, the subsequent swelling in water being naturally more rapid.

Adansonia Gregorii	6?	hours	.012	mm.
Albizzia lophantha	.5	,,	.011	,,
Albizzia pruinosa	1	,,	.011	,,
Albizzia Saman	.5	,,	.026	,,
Alhagi camelorum	.5	,,	.002	,,
Barklya syringifolia	.4	,,	.011	,,
Bossiæa heterophylla	.5	,,	.012	,,
Bossiæa Stephensoni	.5	,,	.011	,,
Canavallia obtusifolia	.42	,,	.003	,,
Cassia australis	.25	,,	.041	,,
Cassia Brewsterii	.25	,,	.042	,,
Cassia eremophila	.25	,,	.012	,,
Cassia laevigata	.25	,,	.008	,,
Cassia suffruticosa	.25	,,	.009	,,
Ceratonia siliqua	.25	,,	.009	,,
Chenopodium album	?	,,	.012	,,
Crotalaria Mitchellii	.5	,,	.018	,,
Cytisus albus	.5	,,	.004	,,
Cytisus triflorus	.5	,,	.005	,,
Daviesia parviflora	1.5	,,	.002	,,
Dillwynia ericifolia	1.5	,,	.003	,,
Dillwynia floribunda	1.5	,,	.003	,,
Dolichos sinensis	.42	,,	.002	,,
Erythrina Vespertilio	.75	,,	.002	,,
Gompholobium latifolium	.20	,,	.013	,,
Goodia lotifolia	1.42	,,	.022	,,
Guilandina Bonducella	1	,,	?	,,
Hibiscus heterophylla	1	,,	.008	,,
Hibiscus Lampas	1	,,	.026	,,
Hibiscus tiliaceus	.42	,,	.019	,,
Hibiscus Trionum	.5	,,	.023	,,
Hovea heterophylla	.42	,,	.020	,,
Hovea longifolia	.5	,,	.023	,,
Indigofera arrecta	.5	,,	.008	,,
Kennedya monophylla	1.5	,,	.002	,,
Kennedya prostrata	1.5	,,	.013	,,
Kydia (Bastardia) caracas	.5	,,	.005	,,
Labichea lanceolata	.42	,,	.044	,,
Lablab purpureus	.5	,,	.030	,,

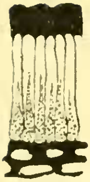
Lathyrus maritimus	.42	hours	.002	mm.
Lavatera plebeia	1.5	,,	.026	,,
Maba seriocarpa	.40	,,	.006	,,
Malva rotundifolia	.5	,,	.004	,,
Medicago denticulata	.42	,,	.005	,,
Medicago sativa	.4	,,	.006	,,
Mirbelia oxyloboides	.5	,,	.013	,,
Mucuna gigantea	8?	,,	?	,,
Oxylobium trilobatum	.42	,,	.015	,,
Pultenaea daphnoides	1	,,	.006	,,
Pultenaea retusa	1	,,	.009	,,
Pultenaea stipularis	1	,,	.004	,,
Swainsona galegifolia	1	,,	.003	,,
Trifolium glomeratum	.25	,,	.009	,,
Wistaria Maideniana	6?	,,	?	,,

EXPLANATION OF PLATES.

All are vertical sections through the epidermis and subjacent layer.

The cuticle is drawn roughly to scale, and is depicted as a deep black line forming the upper border in each drawing

1.—Abutilon oxycarpum, F. v. M.
2.—Acacia myrtifolia, Willd.
3.—Adansonia Gregorii, F. v. M.
4.—Albizzia Saman, Benth.
5.—Alhagi camelorum, Fisch.
6.—Barklya syringifolia, F. v. M.
7.—Bossiæa Stephensoni, F. v. M.
8.—Caesalpinea Bonducella, Fleming.
9.—Canavallia obtusifolia, D. C.
10.—Cassia Brewsterii, F. v. M.
11.—Ceratonia, sp.
12.—Chenopodium album, L.
13.—Crotalaria Mitchellii, Benth.
14.—Cytisus albus, Link.
15.—Daviesia parvifolia, F. v. M.
16.—Dillwynia floribunda, S. M.



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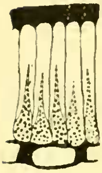

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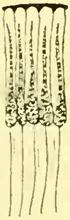

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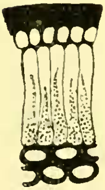

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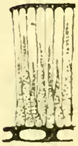

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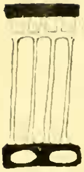

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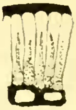

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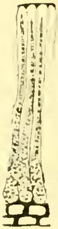

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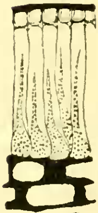

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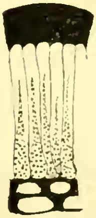

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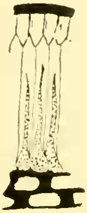

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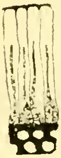

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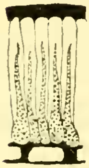

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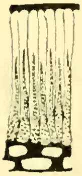

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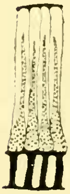

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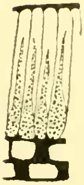

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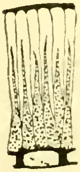

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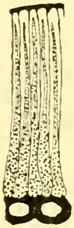

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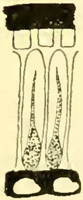

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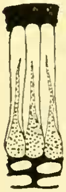

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